

Logistics, Operations and Supply Chain Management

Student Handbook



Class XII



CENTRAL BOARD OF SECONDARY EDUCATION

Shiksha Kendra, 2, Community Centre, Preet Vihar, Delhi-110092

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भारत का संविधान

उद्देशिका

हम, भारत के लोग, भारत को एक सम्पूर्ण¹ प्रभुत्व-संपन्न समाजवादी पंथनिरपेक्ष लोकतंत्रात्मक गणराज्य बनाने के लिए, तथा उसके समस्त नागरिकों को:

सामाजिक, आर्थिक और राजनैतिक न्याय,
विचार, अभिव्यक्ति, विश्वास, धर्म
और उपासना की स्वतंत्रता,
प्रतिष्ठा और अवसर की समता

प्राप्त कराने के लिए
तथा उन सब में व्यक्ति की गरिमा

² और राष्ट्र की एकता और अखंडता
सुनिश्चित करने वाली बंधुता बढ़ाने के लिए

दृढ़संकल्प होकर अपनी इस संविधान सभा में आज तारीख 26 नवम्बर, 1949 ई^o को एतद्वारा इस संविधान को अंगीकृत, अधिनियमित और आत्मार्पित करते हैं।

-
1. संविधान (बयालीसवां संशोधन) अधिनियम, 1976 की धारा 2 द्वारा (3.1.1977) से “प्रभुत्व-संपन्न लोकतंत्रात्मक गणराज्य” के स्थान पर प्रतिस्थापित।
 2. संविधान (बयालीसवां संशोधन) अधिनियम, 1976 की धारा 2 द्वारा (3.1.1977) से “राष्ट्र की एकता” के स्थान पर प्रतिस्थापित।
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भाग 4 क मूल कर्तव्य

51 क. मूल कर्तव्य – भारत के प्रत्येक नागरिक का यह कर्तव्य होगा कि वह –

- (क) संविधान का पालन करे और उसके आदर्शों, संस्थाओं, राष्ट्रध्वज और राष्ट्रगान का आदर करे;
- (ख) स्वतंत्रता के लिए हमारे राष्ट्रीय आंदोलन को प्रेरित करने वाले उच्च आदर्शों को हृदय में संजोए रखे और उनका पालन करे;
- (ग) भारत की प्रभुता, एकता और अखंडता की रक्षा करे और उसे अक्षुण्ण रखे;
- (घ) देश की रक्षा करे और आह्वान किए जाने पर राष्ट्र की सेवा करे;
- (ङ) भारत के सभी लोगों में समरसता और समान भ्रातृत्व की भावना का निर्माण करे जो धर्म, भाषा और प्रदेश या वर्ग पर आधारित सभी भेदभाव से परे हों, ऐसी प्रथाओं का त्याग करे जो स्त्रियों के सम्मान के विरुद्ध हैं;
- (च) हमारी सामासिक संस्कृति की गौवशाली परंपरा का महत्व समझे और उसका परिरक्षण करे;
- (छ) प्राकृतिक पर्यावरण की जिसके अंतर्गत वन, झील, नदी, और वन्य जीव हैं, रक्षा करे और उसका संवर्धन करे तथा प्राणी मात्र के प्रति दयाभाव रखे;
- (ज) वैज्ञानिक दृष्टिकोण, मानववाद और ज्ञानार्जन तथा सुधार की भावना का विकास करे;
- (झ) सार्वजनिक संपत्ति को सुरक्षित रखे और हिंसा से दूर रहे;
- (ञ) व्यक्तिगत और सामूहिक गतिविधियों के सभी क्षेत्रों में उत्कर्ष की ओर बढ़ने का सतत प्रयास करे जिससे राष्ट्र निरंतर बढ़ते हुए प्रयत्न और उपलब्धि की नई उंचाइयों को छू ले;
- '(ट) यदि माता-पिता या संरक्षक हैं, छह वर्ष से चौदह वर्ष तक की आयु वाले अपने, यथास्थिति, बालक या प्रतिपाल्य के लिये शिक्षा के अवसर प्रदान करे।

-
1. संविधान (छायासीवां संशोधन) अधिनियम, 2002 की धारा 4 द्वारा प्रतिस्थापित।

THE CONSTITUTION OF INDIA

PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a ¹**SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC** and to secure to all its citizens :

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the² unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

-
1. Subs, by the Constitution (Forty-Second Amendment) Act. 1976, sec. 2, for "Sovereign Democratic Republic" (w.e.f. 3.1.1977)
 2. Subs, by the Constitution (Forty-Second Amendment) Act. 1976, sec. 2, for "unity of the Nation" (w.e.f. 3.1.1977)
-

THE CONSTITUTION OF INDIA

Chapter IV A

FUNDAMENTAL DUTIES

ARTICLE 51A

Fundamental Duties - It shall be the duty of every citizen of India-

- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers, wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;
- ¹(k) who is a parent or guardian to provide opportunities for education to his/her child or, as the case may be, ward between age of 6 and 14 years.

-
1. Subs. by the Constitution (Eighty - Sixth Amendment) Act, 2002

Preface

Economic liberation through systemic reforms made by the Government has ushered, in India, an era of enhanced opportunities. As foreign investment and new businesses are entering the Indian market, there has been a greater focus on making systems efficient and reducing wastages. To meet the need of making supply chains reliable, efficient and sustainable, the field of Logistics, Operations and Supply Chain Management has assumed a greater degree of importance in today's world.

The demand for focused supply chain services has been fueled by industries with a high propensity to outsource, namely, automobiles, consumer packaged goods, hi-tech, telecom and retail amongst others. Movement of basic commodities for both domestic consumption and export/import has led to increase in multimodal and bulk transportation and proliferation of ports and related services. The Indian logistics sector has grown at a healthy 15% in the last five years and is expected to continue to grow further.

To address the need of economies for skilled manpower, the CBSE has undertaken the project of introducing competency based Vocational Education in its affiliated schools. As a sequel to this, a new course on Transport Systems and Logistic Management is being launched. This will help students to either join the industry after Class XII or pursue higher education in this field. The Student Handbook deals with the concept and objectives of logistics, management of inventory and freight and, the use of information technology for inventory management. The emerging issues in supply chain management and logistics are also discussed.

The Board is grateful to the members of the Course Committee for their advice, guidance and commitment towards development of the course and this handbook. We are indeed indebted to these academic advisors who have lent us the benefit of their rich and insightful experience. I would like to appreciate Vocational Education Cell, CBSE for coordinating and successfully completing the handbook.

**R. K. Chaturvedi, IAS
Chairman, CBSE**



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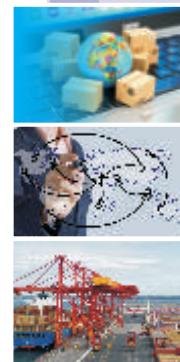
UNIT 1

Logistics and System Concept, Objectives and Role of Logistics

- 1.0 Unit Overview & Description
- 1.1 Introduction
- 1.2 Logistics: A System Concept
- 1.3 Logistics Functions
- 1.4 Logistics Management - Objectives
- 1.5 Role of Logistics in the Supply Chain
- 1.6 Transport Corporation of India - Indian Road Freight Index
- 1.7 Catalysts for Outsourcing Trends
- 1.8 Benefits of Logistics Outsourcing
- 1.9 Third Party Logistics
- 1.10 Fourth Party Logistics
- 1.11 Career & Growth in Logistics and Supply Chain
- 1.12 Summary

1.0 Unit Overview & Description

The unit is an attempt to give idea how logistics works as a system. It also helps to understand about the different elements in logistics system. It also provide an insight about objective and role of logistics in supply chain. Third party and fourth party logistics along with career and growth in logistics and supply chain is expressed in brief to tell its utility.



Knowledge and Skill Outcomes

The Unit is expected to impart the following knowledge and skill:

- ▶ Understand the concept of logistics as a system.
- ▶ Exposure to different elements of logistics system.
- ▶ Assist to understand the objectives of logistics management & its role in supply chain.
- ▶ Understanding to know third party logistics and fourth party logistics.
- ▶ Provides exposures about career & growth in supply chain area.

Resource Material

1. Coyle, John J., Edward J. Bardi, and C. John Langley, Jr., *The Management of Business Logistics: A Supply Chain Perspective*, Mason OH: South-Western Thomson Learning (2013).
2. Donald J. Bowersox and David J. Closs, *Logistical Management: The Integrated Supply Chain Process*, Tata Mc Graw-Hill Publishing Company Limited, New Delhi (2004).
3. Sopie, Vinod V., *Logistics Management: The Supply Chain Imperative*, Pearson, New Delhi (2010).

Learning Outcomes

Unit I	Logistics and System Concept, Objectives and Role of Logistics	Outcomes
1.1	Introduction.	Explain logistics with certain citations like Mumbai dabbawala.
1.2	Logistics: A system concept.	Discuss logistics as system.
1.3	Logistics functions.	Write down the different elements of logistics.
1.4	Logistics management - Objectives.	Discuss the important objectives of logistics management.
1.5	Role of logistics in supply chain.	What is the role of logistics in supply chain.
1.6	TCI - Indian road freight index.	Understand outsourcing.
1.7	Catalyst for outsourcing trends.	What are the catalyst for outsourcing.
1.8	Benefits of logistics outsourcing.	Discuss benefits of logistics.
1.9	Third party logistics.	Understand 3 PL.
1.10	Fourth party logistics.	Understand 4 PL.
1.11	Career and growth in logistics and supply chain.	Different career options of logistics and supply chain.

Assessment Plan

Unit I	Topic	Assessment Method	Time Plan	Remarks
1.1	Introduction	Exercise: Question & Answer, T & F		
1.2 and 1.3	Logistics: A system concept Logistic functions	Exercise: T & F, Question & Answer, Match the following		
1.4	Logistics management - objectives	Exercise: T & F		
1.5, 1.6, 1.7, 1.8, 1.9, and 1.10	Role of logistics in the supply chain, TCI - Indian road freight index. Catalysts for outsourcing trends, Benefits of logistic outsourcing, 3 PL and 4 PL	Exercise: Question & Answer, T & F		
1.11	Career & growth in logistics & supply chain.	Exercise: T & F		

1.1 Introduction

Logistics Defined

The word Logistics traces its origin to the Greek word logistikos and the Latin word logisticus, meaning the science of computing and calculating. In ancient times, the term was frequently used in connection with the art of moving armies and supplies of food and armaments to the war front. The use of this word can be traced back to the seventeenth century in the French army. But during World War II, logistics gained importance in army operations as a term referencing the movement of supplies, men and equipment across the border. The US army officially used the word "logistics" after World War II. Today logistics has acquired a wider meaning and is used in business to refer to the movement of raw materials from suppliers to the manufacturer and, finally, the movement of finished goods to the consumers.

Logistics is also referred to as a physical distribution. Philip Kotler defines logistics as "Planning, implementing, and controlling the physical flows of materials and finished goods from point of origin to point of use to meet the customers need at a profit." The American Council of Logistics Management defines logistics as "the process of planning, implementing and controlling the efficient, cost effective flow and storage of raw materials, in process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customers requirements."

Logic in Logistics for 30 Minutes Pizza



Figure 1.1: Pizza from the Angle of Logistics

Ideally, the time taken for registering the order should be one minute. After that the pizza goes to the guy in the "make line". He takes two minutes, and then oven time is five minutes. When the pizza comes out of the oven it is inspected. One minute goes into quality check and packing. Another minute goes in checking the route and confirming the order one last time.

The moment he is leaving, the delivery boy shouts the out-of-the-door time, which is normally between 10 and 12 minutes. Then everybody yells out "drive safe". When he returns he punches the time in. At the end of the day the average delivery time for all his orders is checked. This helps the manager figure out which orders were not delivered in time. The next day, the store manager calls each one of those whose orders got delayed and apologizes.

The essence is process sequencing, just-in-time inventory availability, and time management for the success in this service operation logistics.

Review Question

1. Discuss the definition of logistics as given by American Council of logistics management.

Dabbawalas of Mumbai



Figure 1.2: Dabbawalas in Action

Dabbawalas of Mumbai offer a reliable fool proof logistics system of delivering lunch boxes to over 200,000 office employee every day without mix up of having the wrong tiffin going to the wrong office or arriving late, irrespective of conditions such as rains, strikes, and scorching heat. A team of around 5000 men and women, mostly illiterate, operate in assigned areas in Mumbai, each handling 25-30 dabbas, which is the optimum lot size as more could create confusion and affect promptness, which will lead to customer dissatisfaction. The dabbas are collected from the houses and put in tiffing racks at a network of 96 railway stations all over Mumbai to load into the train for further movement toward delivery points. They use a colour code system on the dabbas to identify the collection and delivery points. After the lunch hour, the system operates in reverse direction,

again displaying accuracy with collection and quality of delivery closer to Six Sigma. This system gives a much cheaper alternative to office workers than having their food in restaurants and food joints. With this logistics system, 400,000 transactions are done daily with the precision of Six Sigma accuracy.

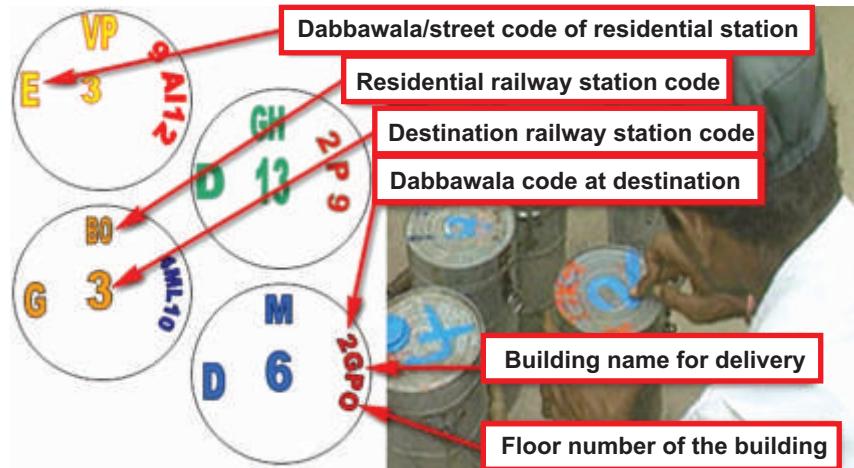


Figure 1.3: Code System of Dabbas

Laundry Service in Five Star Hotels



Figure 1.4: Laundry Service in Five Star Hotels

The laundry service in a five star hotel is a very simple service operation that does not use any sophisticated software tools. At 10 a.m. the housekeeping department collects the laundry from 210 rooms of a 300 room hotel operating at 70 percent occupancy. The laundry is divided into three parts; staff uniforms, room laundry (bed sheets, pillow covers) and guest clothes. Special attention is given to the guest's clothes for same day or express delivery. Every single piece of clothing is allotted an identification code, and the informing is punched into the computer for tracking, processing, and final delivery. The entire laundry is handed over to the laundry service supplier, who collects the laundry in the morning and delivers to the house keeping department in the evening as per the customers requirements.

This is a simple but effective laundry logistics operation of a hotel housekeeping department that leads to customer satisfaction.

Indian Postal Service



Figure 1.4: Indian Postal Service

Indian Postal Service is one of the largest logistics networks in the world today that delivers the letters in the most cost-effective way. The Indian Postal Service operates through a network of 1,52,781 post offices covering 6,09,030 villages, towns, and cities across the country, delivering 43 million letters every day. They use all transportation modes available in India for movement of postal cargo. The collection of letters from 542,781 letter boxes, followed by sorting, packing, moving, unpacking and again sorting for final delivery is mammoth logistical task that they have performed cost effectively for the past one and a half centuries.

Review Question

I. Write True/False against the statement given:

1. Dabbawalas of Mumbai with its logistics system does 4,00,000 transaction daily.
2. The Indian Postal service operates through a network of 15,515 post offices covering 6,09,030 villages, town and cities across country.
3. Time taken in registering order for pizza is one minute.
4. The laundry in five star hotels is divided into two parts: Staff uniform and guest clothes.

1.2 Logistics-A System Concept

In a manufacturing enterprise, the business process starts with the flow of material from the suppliers to the manufacturing plant and then to the customer through the distribution channel. Traditionally, in the functional organization, the business process consists of discrete activities such as procurement, manufacturing, and distribution under the control of the respective departments. The departments may excel in their respective functions, but as an organization, their performance may be dismal. This might happen because of three reasons: (1) a lack of coordination in their activities, (2) different goals to cherish and (3) no single agency could control them to cherish a common goal.

The concept of logistics is based on the system approach. The flow of material from a supplier to a manufacturing plant and finally to the end customer is viewed as a single chain, ensuring efficiency and effectiveness in sequential activities to achieve the objective of customer satisfaction at a reduced cost. Logistics recognizes that all the activities to material movement across the business process are interdependent and need close coordination. These activities are to be managed as a system and not as functional silos. The functional areas of logistics, termed "Logistics Mix" by Martin Christopher, consist of:

1. Information Flow

- ▶ Order Registration
- ▶ Order Checking and Editing
- ▶ Order Processing
- ▶ Coordination



2. Warehousing

- ▶ Material Storage
- ▶ Load Unitizing and Material Handling
- ▶ Site Selection and Network Planning
- ▶ Order Picking and Filling
- ▶ Dispatch Documentation



3. Inventory Control

- ▶ Material Requirement Planning
- ▶ Inventory Level Decisions for Customer Service Objectives

4. Packaging

- ▶ For Handling and Damage Prevention
- ▶ For Communication
- ▶ For Inter Modal Transportation

5. Transportation

- ▶ Route Planning
- ▶ Mode Selection
- ▶ Vehicle Scheduling

The objective of logistics is to facilitate the flow of material across the supply chain of an enterprise so as to cost effectively make available the right product at the right place at the right time. Logistics has to achieve the two polemic goals of customer satisfaction and least cost. This is possible only when all the logistics functions are working as a unified system to achieve the common goal.

1.3 Logistics Functions

Logistics is a process of movement of goods across the supply chain of a company. However this process consists of various functions that have to be properly managed to bring effectiveness and efficiency to the supply chain of the organization. The major logistical functions are shown.

1.3.1 Order Processing

It is an important task in logistics operations. The purchase order placed by a buyer to a supplier is an important legal document of the transactions between the two parties. This document incorporates the description or technical details of the product to supply, price, delivery period, payment terms, taxes, and other commercial terms as agreed. The Processing of this document is important as it has a direct relationship with the order or the performance cycle time, which indicates the time when the order is received and when the material is received by the customer. The order processing activity consists of the following steps:

- ▶ Order checking for any deviations in agreed-upon or negotiated terms
- ▶ Prices, payment, and delivery terms
- ▶ Checking the availability of materials in stocks
- ▶ Production and material scheduling for shortage
- ▶ Acknowledging the order indicating deviations, if any

The above process consumes more time if paperwork is involved. If the processing of the order is slow and complicated, it will have a direct effect on the delivery period committed. It may increase the transportation cost in order to deliver the material faster to compensate for the delays in the order processing operation.

Order processing is a routine operation but requires a great deal of planning, training of people involved, and investment in the system to bring efficiency and accuracy to it. In a large organization where thousands of orders are received each day, it becomes impossible



to manually register the order and process the order quickly and correctly. In such a situation, a system capable of handling such voluminous work with minimum or no human involvement is a necessity. In addition, due to competitive pressure, the order fulfillment cycle has to be shortened to have an edge over the rival firms for retaining the customers.

The only solution is to devise an order processing system ensuring efficiency and accuracy, but with minimal investment costs.

1.3.2 Inventory Management

Inventory management is to keep enough inventory stocks to meet customer requirements, and simultaneously its carrying cost should be the lowest. It is basically an exercise of striking a balance between the customer service for not losing market opportunity and the cost to meet the same. The inventory is the greatest culprit in the overall supply chain of a firm because of its huge carrying cost, which indirectly eat away the profits. It consists of the cost of financing the inventory, insurance, storage, losses, damages and pilferages. The average cost of carrying inventory varies from 10 to 25 percent of the total inventory per year depending on the products. In the case of perishable products, it is on the higher side. Even though inventory is a major concern, without it a firm cannot meet the regular and timely product requirements of its customers.

There are two approaches to inventory management: one is cost approach and the other is customer satisfaction. Business firms try to strike a balance between the two. Due to advance communications and computing facilities, some business firms in business markets are operating on a zero inventory level by adopting the JIT technique. But this is possible with co-partnership between the purchaser and the supplier, and they communicate on a real time basis.



1.3.4 Warehousing

Warehousing is the storing of finished goods until they are sold. It plays a vital role in logistics operations of a firm. The effectiveness of an organization marketing depends on the appropriate decision on warehousing. In today's context, warehousing is treated as a switching facility rather than a storage place. It is a major cost centre, and many problems at the customer end are directly a result of improper warehousing management. Warehouse is the key decision area in logistics. The major decisions in warehousing are:

- ▶ Warehousing of warehousing
- ▶ Number of warehouses
- ▶ Size of the Warehouse
- ▶ Warehouse layout
- ▶ Design of the building
- ▶ Ownership of the warehouse

Warehousing is an important component of logistics as it is directly linked to the ability of a



firm to deliver the desired level of customer service. The ownership of a warehouse is private, public, or contractual. Each has advantages associated with it, and a firm has to choose the best options depending on its objectives and the resources available. However, the decision on warehousing requires proper planning and analysis, as well as help from experts in real estate, industrial engineering, and operations research.

1.3.5 Transportation

For movement of goods from the supplier to the buyer, transportation is the most fundamental and important component of logistics. When an order is placed, the transaction is not complete till the goods are physically moved to the customer's place. The physical movement of goods is through various transportation modes. For low unit value products, the transportation cost component is 20 percent of the product cost. In logistics costs, its share varies from 65 to 70 percent in the case of mass-consumed, very low unit-priced products.

Firms choose the mode of transportation depending on the infrastructure of transportation in the country or region, cost is the most important consideration in the selection of a particular mode of transport. However, sometimes urgency of the goods at the end of customer overrides the cost consideration and the goods are sent through the fastest mode, which is an expensive alternative.

The consideration of whether the firm should have its own fleet or go in for outsourcing depends on investment, operating costs, expertise, and reliability. The common modes available are road carriers, railways, airways, ships, pipelines, and ropeways. Depending on the customers requirements and the availability of transportation infrastructure and its reach and cost, firms decide on the mode with an optimum cost under the given product market conditions.

1.3.6 Information

Logistics is basically an information based activity of inventory movement across a supply chain. Hence, an information system plays a vital role in delivering a superior service to the customers. Use of IT tools for information identification, access, storage, analysis, retrieval, and decision support in logistics is helping business firms to enhance their competitiveness.

Review Questions

- I. **Activity:** Visit one of the daily utility big retail store in your city/town and find about the logistics system and write a report.
- II. **Question and Answers:**
 1. Discuss the various components of logistics system.
 2. Explain the order processing as logistic function.

III. Match the following:

- (a) Information flow - Material Requirement Planning
- (b) Warehousing - Order Picking and Filling
- (c) Packaging - Order Registration
- (d) Transportation - For Intermodal Transportation
- (e) Inventory Control - Route Planning

1.3.7 Logistics for Business Excellence

Logistics is an information based process of material movement from a supplier to the manufacturer and to the customers. Hence, for business excellence, logistics operations need to be integrated on the following two fronts:

1. Integration of logistics into the business
2. Integration of components of logistics

Any business process consists of a set of activities that include raw material procurement, conversion, and the distribution of finished products for selling. To accomplish the objective of making available and the right product at the right place and at the right time with less cost, the help of another process called logistics is needed to take care of the material storage and movement across three stages of a business process. The integration will make the business process run as a chain rather than isolated process elements. The logistics process is a set consisting of a number of activities, including warehousing, material handling, storage, packaging, transportation, and information flow.

For a logistics operation to run smoothly, proper integration among the components of the logistics process is imperative. The efficiency and effectiveness of the entire system depend on how individual elements get coordinated and work as a system and not as functional silos.

In an integrated logistics process, a close coordination between inventory flow and information flow is essential for system efficiency and effectiveness. For a manufacturer, the inventory flow starts after the material is shipped from a supplier to the processing or manufacturing centre and ends with the delivery of the finished product to the customer or usher. In the case of a retailer, the logistics process starts after the material is dispatched from the manufacturer or wholesaler and ends with final delivery to the user. The volume of logistical activities varies with the width of the supply chain, the product category, and the volume of the business.

In a business process, there is continuous value addition at each stage of inventory transportation until, it is finally delivered to the customer. Logistics supports the value creation process and hence it requires continuous attention of the management. For the focused attention, logistics activities can broadly be divided into three areas of business operations wherein the logistics needs are quite different.



1.3.8 Procurement

It is also known as buying or purchasing activity. The material movement from suppliers to the buyer comes under the purview of inbound logistics. The raw material, components, parts, and consumables required for manufacturing operations should be available at the plant at the start of production schedules. The logistics activities include transportation and storage. The focus here is on a timely movement of the goods in an economic load size for transportation. Procurement is concerned with availability of desired material for the manufacturing in the right quantity. To save on the inventory carrying costs, the frequent but small lot sizes are planned. However, with an increased transportation frequency, the freight charges may go up, which may be offset by savings on inventory carrying costs.

1.3.9 Processing

The logistics operation in manufacturing is concerned with movement of in-process or work in progress inventory. Logistics here helps in preparing production scheduling. It is concerned with availability of inventory for the products to be manufactured, the places where they are manufactured, and the timings when they are manufactured. For example, the sub-assemblies for the truck will be manufactured at the decentralized locations from where these have to be brought to the main plant for carrying out the main truck assembly. The process logistics here takes care of the movement of the right parts and components to the respective sub-assembly plants and from there to the main assembly plant as and when required as per the production schedules. Process logistics takes care of the movement of inventory for requirements of the internal customer where the degree of uncertainty is very low because the manufacturing operations are under the control of management.

1.3.10 Distribution

The movement of finished goods from a manufacturing plant to the customer or user comes under the purview of outbound logistics. The availability of material at the point of sale and the time it is required by the customer is vital for an enterprise to encash the opportunity. The material may be required at various places in the distribution channels. The requirement of each of the channel members may be different in terms of quantity, product variety, frequency of delivery, transportation, and so on. The outbound logistics ensures movement of the material as per the requirements at the right place and at the right time, but with the minimum cost.

The logistics activities at three places- procurement, processing, and distribution in a supply chain overlap, but the requirements are different. Hence, the prime goal of the integrated logistics should be to co-ordinate the inventory movement across the supply chain for system effectiveness and efficiency to gain a competitive advantage.

Review Question

1. **Activity:** Visit any important transport company and observe the procedure it follows in getting registered order and planning route for the order and formalities. Discuss the same in your class room.

1.4 Logistics Management - Objectives

The primary objective of a logistics system is to move the inventory in a supply chain effectively and efficiently to extend the desired level of customer service at the least cost. To achieve this, the following subsets of the above broader objective need to be achieved:

1.4.1 Inventory Reduction

Inventory is the biggest culprit in adversely affecting the bottom line of an enterprise. Through a financial accountancy perspective, inventory is an asset and does not cause any appreciable disadvantage even when it is stocked in an excess quantity. Traditionally, firms have carried an excess of inventory for the purpose of extending excellent customer service. However, inventory as an asset requires investment to possess it. The funds invested are blocked and cannot be used for any other productive purpose. Moreover, there is a capital cost associated with it. The carrying cost will be equivalent to the interest on the funds at the bank borrowing rates currently applicable. The carrying cost will be drained on the enterprise profits. Hence, the prime objective of logistics is to maintain the inventory at the minimum level. However, the customer service goal can be managed through small but frequent supplies. A higher transportation cost will be much lower than the inventory carrying cost resulting in better margins.



1.4.2 Reliable and Consistent Delivery Performance

On-time delivery is crucial to the customer to maintain his production schedule. The customer is not interested in a faster delivery of the material ahead of production schedule. This area of operation is subject to variance. However, proper planning on transportation modes and inventory availability along with a variation factor will reduce the variance. The other objective of logistics should be consistency in delivery performance, this will help to build customer confidence for keeping a long term relationship.

1.4.3 Freight Economy

Freight is a major cost element in logistics cost. This can be reduced by adopting measures such as freight consolidation, transport mode selection, route planning, load unitizing, and long distance shipments.

1.4.4 Minimum Product Damages

Product damages add to the logistics cost. The reason for product damages are improper logistical packaging, frequent consignment handling, absence of load unitizing, and so on. Use of mechanized material handling equipment, load unitization and proper logistical packaging will reduce the product damages.

Review Question

I. From the following statements, write down the True/False against each statements:

1. When an order is placed, the transaction is not complete till the goods are physically moved to the customers place.
2. Information system plays a role in delivering an inferior service to the customers.
3. The primary objective of a logistics system is to move the inventory in a supply chain effectively and efficiently.

1.5 Role of Logistics in the Supply Chain

Logistics basically connects the source of supply with the sources of demand. It bridges the gaps between market demand and the capabilities of supply sources. Logistics helps in bridging these gaps so as to make them invisible at the logistics system such as the warehousing network, transportation network, inventory control system and supporting information system are put into operation with the objective of delivering the right product at the right place and at the right time with the least cost. The logistics system has to fulfill the two primary objectives of customer service and cost while striking a balance between them.

Logistics makes it possible to deliver a product to the customer anywhere, irrespective of its manufacturing location. It is deployed for making a daily shipment of products manufactured once a week / month or otherwise as per market needs. Logistics facilitates either a full truckload or shipment once a week or a part load daily as per the requirement of customers. Thus logistics fills the gap between supply and demand. However, when these gaps tend to be larger and the risk of dilution of service level is high, an integrated system is needed to make the operation seamless for product and information flow. SCM is a process of integration to bridge the gap between supply and demand. Today, we are talking of a virtual supply chain where in the cycle time it is reduced to zero, no warehouses exist, as inventory levels plummet to near zero and freight is cut down to a minimum through networking. This is an ideal situation but attempts should be made to achieve this goal. After trading half the path toward the goal as above, it becomes progressively easier to tread the remaining path and bridge the gap. SCM helps to close this gap by enhancing and then aligning the capabilities through enablers such as technology, collaboration and human resources skills.

The supply chain banks on the relationship with suppliers for performance cycle reduction, quality improvement, freight minimization and reduction in cost of material and transaction. It emphasizes flexibility in manufacturing capability for producing volumes and variety to quickly respond to the market demands, irrespective of time and place limitations. On the distribution side, the supply chain is needed in order to make products available at the point of sale or consumption as and when required, so as to minimize loss of sales due to non-availability of products. This channel remembers requirements, speedier, reliable and



consistent freight movements, load utilization, cross-docking, and freight consolidation. The supply chain tries to understand the demand signals and profiles the target customer base to adjust itself for planning and execution of customer requirement in accordance with the desired service level.

Logistics capabilities supplement supply chain operations. The efficiency and effectiveness of inventory movement across the supply chain is largely dependent on the capability of logistics management. Hence, integration of the supply chain is not possible without the capability and reliability of the logistics operation. Cost reduction and customer service enhancement in the supply chain are not possible without efficient logistics operations such as warehousing, material handling, inventory control, packaging and transportation. In fact, logistics and SCM cannot be separated from each other, since they are part of the same customer service solution. Logistics operation may continue irrespective of whether or not an enterprise follows the supply chain philosophy. Inventory movement needs to take place to bridge the gap between demand and supply chain philosophy. On the other hand, the success of a supply chain is greatly dependent on logistics. However, for the success of both logistics and the supply chain, the following operations need to be taken care of, planned and managed properly:

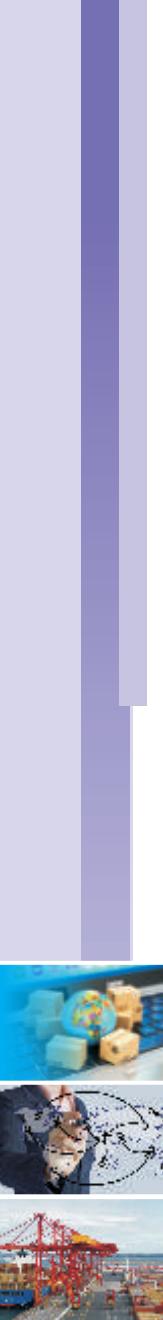
- ▶ Close coordination with suppliers
- ▶ Reduce inventory levels
- ▶ Speed, reliability, and consistency in inventory movement
- ▶ Faster replenishment cycle
- ▶ Shorter performance cycle
- ▶ Flexible manufacturing cycle
- ▶ Asset utilization and productivity
- ▶ Innovations for value additions in customer service offerings



In a nutshell, logistics is the key to the success of SCM. The degree of success depends on the level of integration between them using the enablers such as information and communication technology.

1.6 Transport Corporation of India- Indian Road Freight Index: The Route Map for Tracking Freight Rates

Transport Corporation of India (TCI) is known as one of the leading multi-modal integrated supply chain solutions provider in India. TCI enjoys an extensive set up of 1100 branch offices, 5700 work force and over two lakh satisfied customers because of its customer centric approach and world class resources, which they have developed over past five decades. TCI believes in continuously upgrading and establishing innovation for industry benchmarks. TCI has also introduced a pioneering service by the name of Indian Road



freight Index (IRFI) in 1998, which can be defined as an index of weighted average lorry freight rates across different routes, similar to that of stock market index the freight rates are very dynamic in the existing overland lorry freight industry, dominated by small regional operators. The existing market is very sensitive to issues such as supply demand of trucks, seasonal fluctuation, fuel price hikes, off-loading of major shipment, etc.,. Lacks of comprehensive information regarding freight rates and the density of freight Lorries on certain routes etc. are the major lacuna in the existing system. Therefore, prediction of the ongoing trend in the freight rates, the emerging trend in the lorry availability for a given period of time and analysis of the freight rates become very difficult. As a result, freight rates for different routes on required dates are not available readily, which in turn hampers the analysis of the freight rates and movement of the shipment for both local and national levels. Wide fluctuations of freight rates are caused because of lack of such comprehensive data, thereby leading to non-optimization rates very difficult. No studies have been carried out on rates structure and therefore no databases are available on the rates and volume of material transported through each routes. TCI initiated this service to bring in benchmarks, the best practices and standardization of supply chain solutions in this sector in India, based on global practices.

RFI is a tool which helps in making comprehensive analysis of route wise and data wise freight trends, and also helps in forecasting the freight trends and freight rates for the near future.

1.6.1 Outsourcing

To survive in today's competitive markets, companies are focusing on their core competencies and adopting outsourcing as a strategic solution to improve quality of service and reduce cost of important as well as non-core processes. Using the strategic partnership of third-party logistics service providers, in integrated logistics, the companies world over have reported gains such as reduction in logistics costs, logistics assets and order cycle time. Today, it is an accepted trend in the industry to form a collaborative relationship with the logistics service provider for knowledge based supply chain integration that rests on IT as the backbone.

1.7 Catalysts for Outsourcing Trends

Today business organizations across the world are struggling to compete not only for growth but mere survival. The factors responsible for this are the liberalized economies of countries across the world, globalization of businesses and recessionary trends in the markets. Moreover, the customer has become more demanding and is looking more for value-added services from prospective suppliers, as he wants value for the money he is spending. In such a situation, business organization across the world, after reviewing their business processes, are increasingly realizing that cost cutting and differentiation in value delivery system are solutions to the current problem. This can be achieved through outsourcing the

non-core operations to experts in the field and concentrating on core business areas. The expert can do the job both cost effectively and efficiently. Hence, a growing trend observable in the industry today is a "hollowing out" of corporations. In other words, the large companies are increasingly outsourcing non-core business process and gaining operating efficiencies and effectiveness by engaging the services of experts in that particular field.

1.8 Benefits of Logistics Outsourcing

In a logistics operation considerable quantities of materials are required to be transported and stored at various locations. Raw materials and components are to be moved over long distances from vendor supply points to production centers. Starting from outsourcing of IT and HR Functions, Indian corporations have come a long way and understood the value and benefits they get from outsourcing such functions, wherein they feel they do not have the required expertise. Logistics is one of the operations in which the majority of Indian business corporations do not have expertise. Hence, after the liberalization of Indian economy in 1991, when the heat of competition was being felt, outsourcing became a corporate mantra for building competitiveness. In the developed countries, logistics outsourcing is treated as a strategic solution to improve quality of service and reduce the cost of important non-core processes. Therefore, such processes are outsourced to logistic service providers having a core competency in their area of logistics. The storage service relates to materials that have to be stored for some time as raw materials and later as finished goods.

Finished goods have to be transported to the point of consumption. As the production and consumption cycles never match, storage becomes inevitable. But the stored inventories have to be judiciously controlled for their carrying cost that is a drain on the company's profits. In such cases, the logistics service provider takes care of all hassles and ensures the availability of right product at the right place and at the right time. Logistics operation is a specialized functional area and the majority of marketing and manufacturing organizations have no expertise in it. Hence, the need to outsource operations to the expert in the field has to be taken seriously. The opportunity cost, which the traditional distribution system carries due to lost time in dealing with multiple vendors, transports, C&F agents, freight forwarders, octroi authority and customs agents, is a major hurdle in the company's overall competence. To overcome this hurdle and bring effectiveness and efficiency to the distributing system, outsourcing becomes necessary. The critical reasons why companies outsource logistics activities are:

- ▶ To focus on core competencies
- ▶ Resource constraints
- ▶ Cost saving resulting from better management of the supply chain
- ▶ Cross-pollination of better available practices
- ▶ Wider geographical coverage



In highly competitive markets, logistics outsourcing provides the operational flexibilities to meet the changing needs of the customers. Logistics services can also be customized for major markets or key accounts. As organizing the logistics infrastructure is the service provider's responsibility, the outsourcers need not have to worry about the assets becoming outdated. The switching over to a new logistics partner is possible due to the changing needs of customers. The requirement of funds for investment in transportation fleet, warehouses, handling equipment and storage arrangement is absolutely eliminated and the responsibility falls on the service provider to create infrastructure. The human resource requirement is minimized and is limited only to co-ordinating and monitoring the service provider's activities. Therefore, leading firms hire the services of experts using best practices in the outsourced area, and there hired, services are available at lesser cost.

1.9 Third Party Logistics

The trend of using a strategic partnership in integrated logistics has now become an accepted practice in the industry. These partners are called "third party service providers" or 3PL (short for third party logistics) firms. These firms are external to the company and provide one or more aspects of their entire logistics service product portfolio. These logistics services can be provided on a stand alone or an integrated basis. The stand alone operator is called a "wholesaler", who extends only one type of service in which it has expertise. It may be any of such services as warehousing, transportation, inventory management, packaging and so forth. However, the one who provides the total logistic services and offers entire solutions to customer problems is called the "integrator". The trends in the industry show a preference for integrated logistics solution providers, as the solution to several logistics problems can be handled from a single source.

A **third-party logistics provider** (abbreviated **3PL**, or sometimes **TPL**) is a firm that provides service to its customers of outsourced (or "third party") logistics services for part, or all of their supply chain management functions. Third party logistics providers typically specialize in integrated operation, warehousing and transportation services that can be scaled and customized to customers needs based on market conditions and the demands and delivery service requirements for their products and materials. Often, these services go beyond logistics and included value-added services related to the production or procurement of goods, i.e., services that integrate parts of the supply chain. Then the provider is called third-party supply chain management provider (3PSCM) or supply chain management service provider (SCMSP).

Third Party Logistics System is a process which targets a particular function in the management. It may be like warehousing, transportation, raw material provider, etc.

According to the Council of Supply Chain Management Professionals, 3PL is defined as "a firm that provides multiple logistics services for use by customers. Preferably, these services are integrated, or bundled together, by the provider. Among the services 3PLs provide are transportation, warehousing, cross-docking, inventory management, packaging, and freight forwarding."

Types of 3PL Providers

Third-party logistics providers include freight forwarders, courier companies, as well as other companies integrating & offering subcontracted logistics and transportation services.

- ▶ **Standard 3PL Provider:** This is the most basic form of a 3PL provider. They would perform activities such as pick and pack, warehousing and distribution (business) the most basic functions of logistics. For a majority of these firms, the 3PL function is not their main activity.
- ▶ **Service Developer:** This type of 3PL provider will offer their customers advanced value-added services such as: tracking and tracing, cross-docking, specific packaging, or providing a unique security system. A solid IT foundation and a focus on economies of scale and scope will enable this type of 3PL provider to perform these types of tasks.
- ▶ **The Customer Adapter:** This type of 3PL provider comes in at the request of the customer and essentially takes over complete control of the company's logistics activities. The 3PL provider improves the logistics dramatically, but do not develop a new service. The customer base for this type of 3PL provider is typically quite small.
- ▶ **The Customer Developer:** This is the highest level that a 3PL provider can attain with respect to its processes and activities. This occurs when the 3PL provider integrates itself with the customer and takes over their entire logistics function. These providers will have few customers, but will perform extensive and detailed tasks for them.

Initially, corporations were outsourcing only warehousing and transportation to 3PL firms, but as their confidence levels went up and benefits started accruing, the 3PL firms were invited to provide services in the areas of traffic management, multi-modal transportation, freight consolidation, cross-docking, freight auditing, payment collections, and so on. More and more companies began using 3PL services as a source of strategic advantage with a view to achieving broader business objectives in addition to cost saving and cycle time reduction. Some of the broader objectives the corporations have in mind when going in for 3PL services are:

- ▶ Reduction in risk and liability
- ▶ Value-added services to customer
- ▶ Wider market coverage



1.10 Fourth-Party Logistics

IT industry is playing a major role in logistics and supply chain management. Today, the integration of logistics, which is a complex exercise, is totally dependent on the support of IT. Third-party logistics suppliers are providing logistics solutions to their clients, based on their experience and domain knowledge that they have acquired and developed over the years in the logistics business. However, a new trend has emerged wherein the IT firms are



providing logistics solutions built around domain knowledge provided by third-party logistics companies. This new breed of companies is the fourth-party logistics service providers or 4PL firms.

4PL - A firm coined by the Anderson Consulting Company is the next significant evolution in logistics management. It is slowly gaining ground internationally. According to Anderson Consultants, "4PL assembles and manages the resources, capabilities and technology of its own organization with those of complementary service providers to deliver a comprehensive supply chain solution." However, the dividing line between 3PL and 4PL is very thin. The leading 3PL companies in the United States believe that 4PL is a hype created by management and IT consultancy firms to appropriate the best part of the logistics business that has been built by 3PL companies through relentless effort over the years. The genesis of 4PL lies in forming a collaborative relationship among various logistics service providers based on IT as the backbone. A network arrangement of this kind can be termed as 4PL, provided it fulfills the following requirements:

- ▶ Covers the entire supply chain of the customer.
- ▶ Collaboration between two or more logistics service providers on a resource sharing basis to extend logistic solutions to a common customer.
- ▶ Alliances to be led by integrator with IT-based and not asset-based service provider.
- ▶ Flexible arrangement.

For example, a 4PL company of fast moving consumer goods (FMCG) Indian manufacturer operating in the Indian and overseas markets, which needs to integrate its entire logistics operations handled by different 3PL firms in different geographical areas assigned to them, shall design and operate one single central information system instead of the different systems in different areas by each 3PL firms. A 4PL firm fulfills all the different needs of the client from a single source instead of getting into multiple 3PL alliances to achieve through multiple sources objectives.

Unlike the traditional methods that focus on reduction in operational cost and asset transfer, 4PL works in the following four ways:

1. Increases revenue
2. Reduces cost
3. Reduces working capital
4. Reduces fixed capital

4PL is an emerging trend and there are very few 4PL firms operating across the world. A complex model, 4PL offers greater benefits in terms of economies of scale. Recently, Hewlett Packard (HP) has appointed Circle International (CI) as their 4PL partner in the Asia Pacific region. CI operates from their central hub located in Singapore, where it buys and

stocks HP's inventory requirement in the region. The network of warehouse hubs, spread across the countries in the region, takes care of the distribution. The local HP office in the country draws its inventory requirements by buying from the CI local hub. HP does not block its funds in inventory. Thus 4PL provides logistic services by blocking its own money in someone else's products and components.

Review Questions

I. Question and Answer:

1. Write down the important objectives of logistics management.

II. Activity:

1. Visit third party logistics providers working in your town / city to observe its functioning and discuss in the class room.
2. Explain in brief the important differences between 3 PL and 4 PL providers.

1.11 Career & Growth in Logistics and Supply Chain

Logistics and Supply Chain Management has become prominent and acknowledged as critical factor in establishing competitive advantage in several developed countries. Expansion of international trade and globalization strategy of many companies has increased importance of Logistics and Supply Chain Management. Aggregate cost of Logistics and Supply Chain can account for upto 30% of total landed cost of goods. Giving careful attention to Logistics and Supply Chain Management results in reduction in costs and thus better performance for companies Logistics and Supply Chain Management Industry directly or indirectly contributes estimated 25% to most countries GDP and employs several million people.



Logistics and Supply Chain Management Involve

Effective day to day management of:

- ▶ Transport
- ▶ Storage and Warehousing
- ▶ Inventory/Stock Control
- ▶ Purchasing
- ▶ Packaging
- ▶ Manufacturing Management

Logistics and Supply Chain Management integrates with and is essential to many areas of business operations such as retailing, production management, quality control, importing and exporting, project management, forecasting etc.

Challenges for Logistics and Supply Chain

The top five challenges are:

1. Lack of Skilled and Trained Manpower
2. Customer Expectations
3. Pressure of Cost Control
4. Planning and Risk Management
5. Communication with Suppliers/ Partners

Attracting Talent

- ▶ Demand for qualified personnel in Logistics and Supply Chain Management far exceeds supply.
- ▶ Need to break perception that the sector is only "trucks and sheds". The sector provides variety of career pathways with progression opportunities through to senior management.
- ▶ Workforce and working patterns keep changing and thus need to target demographics which are entering workforce in large numbers, such as women and youth.
- ▶ Today only approx 20% of Logistics and Supply Chain Management professionals are women.

Career Opportunities and Potential Employers

Companies today realize the critically important role that supply chain plays in the financial performance of the organization. Companies are looking for supply chain professionals that can transform their supply chain into a source of competitive advantage. In today's global economy, companies like Dell, Nokia, Proctor & Gamble, Toyota, and Wal-Mart consider SCM to be a key factor in their success. SCM makes it possible to build and deliver products better, faster, and cheaper. Supply chain managers are the "glue" that connects the different parts of the organization.

Businesses realize that being competitive in the 21st century requires leading edge thinking around supply chain management and logistics. Companies large and small are looking for talented individuals with a strong mix of education, potential, and motivation to manage and lead their global supply chains. You will find SCM career opportunities in a variety of organizations such as manufacturing and production companies, service providers, retailers, transportation companies, third party logistics firms (3PL), government agencies, and consulting firms. The array of companies needing supply chain expertise is nearly endless. Successful firms such as Disney, Hewlett-Packard, Boeing, FedEx, Nike, Nestle, and Best Buy are just a few examples of companies that actively hire SCM graduates.

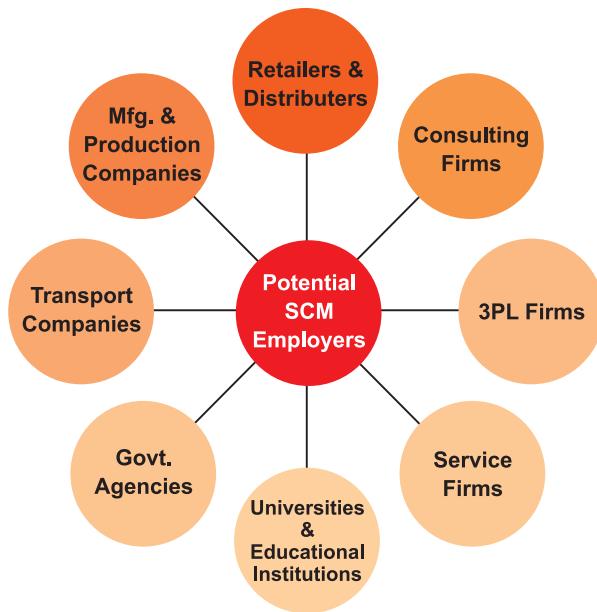


Figure 1.5: Potential Employers for Supply Chain and logistics

Review Question

I. From the following statements, write down True/False against each statement:

1. Logistics and supply chain management involve effective day to day management of transport.
2. Demand for qualified personnel in logistics and supply chain management does not exceed supply.
3. Companies large and small are looking for talented individuals with a strong mix of education, potential and motivation to manage and lead their global supply chains.



1.12 Summary

This unit provides introduction to some of the best practices provided in logistics industry. It also discusses logistics system and its various elements. Further, the unit also provides a brief introduction of the role of logistics in supply chain, third party logistics, its types and fourth party logistics. It also briefly outlines the career and opportunities in the field of logistics and supply chain.

1.13 Exercise

1. Define the term logistics as discussed by Philip Kotler.
2. What is logistics -a system concept? Discuss.

3. Explain important elements of logistics system?
4. Write down the important system of information flow and warehousing.
5. Discuss the main objectives of logistics management.
6. Explain the role of logistics in supply chain.
7. What is third party logistics explain its types.
8. Examine the career opportunities in the field of logistics and supply chain.

1.14 Practical

1. Taking the case of Dabbawalas of Mumbai discuss the following points in the class room.
 - a) Evolution
 - b) Preparation of lunch boxes.
 - c) Man power & its management.
 - d) Identification of dabbas for its consumer & its confirmation.
 - e) Warehousing of dabbas.
 - f) Information of lunch box delivery man.
 - g) Collection of boxes after its delivery.
 - h) Uninterrupted supply in odd weather and season.
2. Visit a nearby company in your town / city and prepare a note on its customer information flow for its demand to be processed.
3. Visit a business unit / company nearest to your town / city and prepare a note on logistics system concept adoption activity.



UNIT 2

Inventory Management

- 2.0 Unit Overview & Description
- 2.1 Inventory Management and Supply Chain
- 2.2 Inventory Functionality
- 2.3 Inventory Related Cost
- 2.4 Inventory Controls
- 2.5 Case Study
- 2.6 Summary

2.0 Unit Overview & Description

The unit focusses on the inventory related issues in supply chain and logistics, its function and cost. It also assists to understand different types of inventory cost in any supply chain operation and methods of control techniques.

Knowledge and Skill Outcomes

The unit is expected to impart the following knowledge and skill:

- ▶ Understanding of inventory management and supply chain.
- ▶ Awareness relating to inventory functions.
- ▶ Provides exposure to inventory functionality.
- ▶ Understand the reasons for carrying inventories.
- ▶ Enables to find inventory related costs.
- ▶ Provide ways for inventory controls.



Resource Material

1. Reji Ismail, Logistics Management, Excel Books, New Delhi (2008).
2. Ballou, Ronald H., Business Logistics and Supply Chain Management, Pearson Education.
3. Sopie, Vinod, Logistics Management the Supply Chain Imperative, Pearson, New Delhi (2010).

Learning Outcomes

Unit II	Inventory Management	Outcomes
2.1	Inventory management and supply chain.	Explain the relation between inventory management and supply chain.
2.2	Inventory functionality.	Discuss the inventory functions and cost.
2.3	Inventory-related cost.	Identify the different inventory related cost.
2.4	Inventory controls.	Discuss the different cost control techniques of inventory management.

Assessment Plan

Unit II	Topic	Assessment Method	Time Plan	Remarks
2.1	Inventory management and supply chain.	Exercise: T & F		
2.2	Inventory functionality.	Exercise: Q & A, T & F		
2.3	Inventory-related cost.	Exercise: Activity, Q & A, T & F		
2.4	Inventory controls.	Exercise: Activity, Q & A, T & F		



Figure 2.1: Inventory



Figure 2.2: Pharma Retail

2.1 Inventory Management and Supply Chain

Inventory is technically an asset, but it is indirectly taxing on the profitability of the firm. Hence, besides the various activities associated with a lean supply chain, corporation across the world are always finding different methods and techniques to reduce the investments in inventory. With the latest IT tools and communication technologies, it has become comparatively easier than before to size and control this single largest cost spinner in the supply chain. It is probably common sense that inventory should be held only when the benefits to holding inventory exceed the cost of holding it.

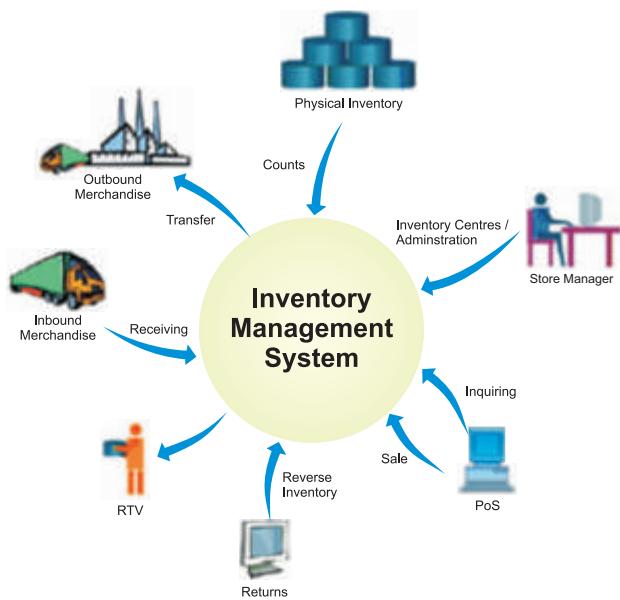


Figure 2.3: Inventory Management System



Figure 2.4: Inventory Liability



2.1.1 Inventory-Asset or Liability

Inventory generally constitutes the second largest item after fixed asset in the financial balance sheet of a manufacturing company. From a financial perspective, inventory is one of the major current assets that can contribute to maximizing the value of the firm and no significant disadvantages are seen in carrying more inventory. But investments in inventory carry cost. Funds invested in inventory cost the firm by way of interest on working capital borrowings from the bank at the current interest rates. Therefore, reduction in inventory will reduce inventory handling and carrying costs. The benefits of inventory reduction will be reflected in terms of increase in profit margins, return on investment (ROI) and economic value addition (EVA).

Today, inventory investment is viewed as a supply chain cost driver rather than as a material asset. Hence, the lean supply chain operating on material requirement planning (MRP), distribution requirement planning (DRP) or the just - in - time (JIT) system is preferred, since it has the maximum inventory turns for reducing cost on inventory investments and enhancing the bottom line and return on investments.

Review Question

I. State whether the following statement is True or False:

1. Inventory is technically an asset, but it is indirectly taking on the profitability of the firm.
2. From a financial perspective, inventory is one of the minor current assets.
3. Reduction in inventory will reduce inventory handling and carrying costs.
4. Inventory management is an ordinary area in logistics operation.

2.1.2 Inventory Functions

Inventory management is a strategic area in logistics operation and has an impact on efficiency and effectiveness of the overall supply chain system. As the cycles of production and consumption never match; goods have to be kept in stock to get over the uncertainties in demand and supply. However, higher inventory levels will affect the bottom line of the company. This is a high risk and high impact area, which has to strike a balance between the two polemic goals of lower cost and a higher level of customer service.

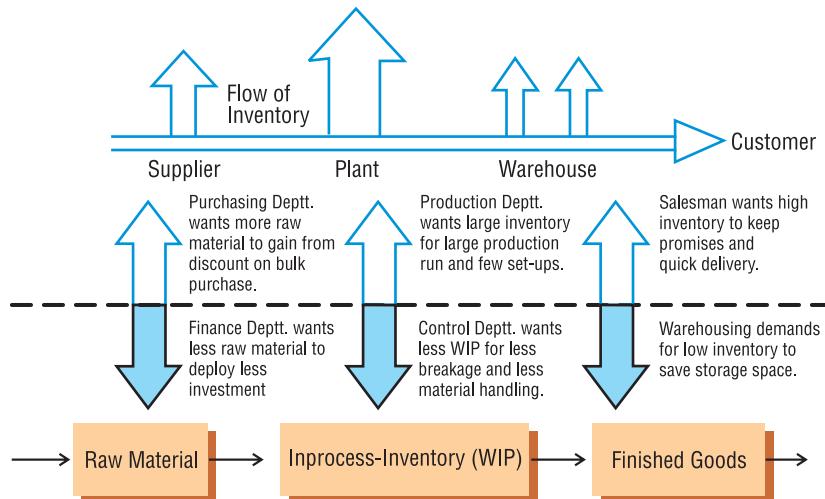


Figure 2.5: Inventory Position in an Organization

Companies block sizable funds in their inventories, which would otherwise have been invested in more productive areas. The general categories of inventory are as follows:

- ▶ Raw material and components inventory
- ▶ Work in progress inventory
- ▶ Finished goods inventory
- ▶ Maintenance, repairs and operating supplies inventory
- ▶ Pipeline or in transit inventory

Inventories are held in warehouses that have an inescapable accountability for the inventories in their charge. The inventory levels in the company also affect the efficiencies of the other divisions. Inventory acts as a protective cushion for continuous operation in the customer supply chain. The top management views inventory as cash investment and expects to derive profits from it through effective and efficient customer service. Investments in inventory can cause cash flow problems if the inventories are poorly managed by way of inaccurate forecast and excess production. Inventory management is both an art and a science and is concerned with the following:

- ▶ Right level of inventory
- ▶ Trade off between inventory cost and customer service
- ▶ Treating inventory as a liability or asset

The industry will have to manage basically three types of inventories that are held at the various stages of the supply chain of a company. These are:

- ▶ Raw materials and components on the procurement side
- ▶ In-process or work in progress inventory
- ▶ Finished goods inventories

In logistics we are mainly concerned with the finished goods inventories, which again are divided into the following three parts:

- ▶ Non-excise paid goods at plant warehouse
- ▶ Inventory in transit
- ▶ Channel inventory

Inventory blocks capital; that is, investment in inventory cannot be used for creating assets, producing other goods or investing in other productive ventures or projects. Inventory carries the risk of theft, pilferage or obsolescence. However, the nature of risk varies with the enterprise's position in the distribution channel.

Review Questions

I. Question and Answer:

1. Write down the important inventory functions in logistics operation.

II. Write True or False against the following statements:

1. The top management views inventory as cash investment.
2. Inventory management is only an art.
3. Industry manage three types of inventory.



2.1.3 Manufacturer

As the manufacturer has to simultaneously keep inventories of raw materials, work in progress and finished goods, the depth of risk is highest among the other members of the supply chain. Inventory commitments of the manufacturer are of a longer period, even though his product lines are narrower as compared to wholesalers or retailers. Inventory commitments are closely related to the investments made in width of the distribution network, unit value of the product, and the nature of demand.

2.1.4 Wholesaler

The Product lines handled by the wholesaler are more than for the manufacturer. The wholesaler's risk is spread over the different products. These different products may face cycling variations in product lines. For seasonal products, the wholesalers purchases the inventory commitments however, the wholesaler does not retain inventory of a longer duration than the manufacturer.

2.1.5 Retailer

The retailer's risk duration is much shorter than for the wholesaler and manufacturer. His commitment to inventory is not deep. Moreover, the risk is spread over a range of products. The retailer basically buys and sells and does not stock the material for a longer duration. He faces the risk of marketing rather than of inventory.

2.2 Inventory Functionality

Irrespective of its location in the supply chain, product inventory essentially serves the following functions:

2.2.1 Balancing Supply and Demand

The production and consumption cycles never matches. The sudden requirement of a product in large quantities may not be fulfilled immediately as the production cannot be taken up so soon. In such a case, the products are manufactured in advance in anticipation of demand and kept in stock for supply during the peak period.

2.2.2 Periodic Variation

For seasonal products the demand is at its peak for a certain period while it is lean for the rest of the year. Production runs in the factory are taken based on the average demand for the year. Excess production during the lean period is kept as inventory to take care of the peak demand. In cases where raw material for manufacturing food products is available seasonally, the products are manufactured and stocked as inventory to meet the demand of the finished products throughout the year.

2.2.3 Scale Economics

Products are manufactured at focused factories to achieve economies of scale. This is done



because of the availability of the latest technology, raw materials, and skilled labour. Hence the produce is kept in stock for distribution to consumption centers as and when it is required. Distribution is done in economical lot sizes for system efficiencies in speed and cost.

In short, inventories provide demand utility for products at the time and places they are required for consumption.

2.2.4 Reasons for Carrying Inventories

Inventory is required for producing finished goods, extending service to customers and to keep the customer's manufacturing operations running. Hence, inventory plays a crucial role in the supply chain of an organization. It helps to keep a smooth flow of products across the supply chain. On the other hand, excess inventory in the supply chain means additional cost for holding inventory, which exceeds the benefits derived from it. The benefits and losses of carrying inventory should be examined in light of the following reasons.

2.2.5 Meeting Production Requirements

Raw material, components and parts are required for producing finished goods. A manufacturing organization keeps stocks of the material to meet the continuous requirements of production. Companies operating on the JIT principle also keep some inventory on hand to meet contingencies. However, these stocks are quantitatively insignificant. The work-in-progress inventory constitutes a major portion of the production related inventory. Reduction in this category of inventory results in inventory related investments in the production process.



2.2.6 Supporting Operational Requirements

To support production operations, inventories are required for repairs, maintenance and operational support. These inventories include spare parts of production machineries, consumables such as lubrication oils and welding rods, chemicals, pallets, and a like. Companies do not have a correct picture of their investments in this category of inventory. Many times excess stock is held to avoid rushing to the market for buying inventory in small quantities in an emergency.

2.2.7 Customer Service Considerations

Product like equipments, machinery or appliances require replacement of spare parts for trouble-free and smooth operations. Suppliers maintain an inventory of these parts to extend after sales service to their valued clients. Availability of spare parts when required at the customer's end is crucial for customer satisfaction and may be used as a tool for competitive advantage. Maintaining a significant level of inventory and keeping it replenished requires a major investment. This is closely related to the level of customer service offered by the company.

2.2.8 Hedge Against Future Expectations

To take care of shortages in material availability or an anticipated increase in the prices of products, the customer usually buys in excess of current requirement, stocking a critical material or product, for keeping their operations running without interruptions. This obviously increases the inventory level for a short period. However, in the above circumstances, the benefits derived from keeping excess inventory outweighs its carrying cost.



Figure 2.6: Stock Clearance



Figure 2.7: Medicine as Inventory in Pharma Store

2.3 Inventory-Related Costs

The major portion of the working capital of a firm is blocked in inventory. If the inventory is in excess of the optimum level, more funds will be blocked that cannot be used for other productive purposes, resulting in opportunity loss. Hence these funds are tied up unnecessarily. There are other costs related to inventory. The incidence of those costs will also be higher if inventories are in excess of the optimum level.

2.3.1 Inventory Cost

Inventory blocks funds, funds once blocked cannot be invested in any other productive activities. The lost opportunity cost is not so easy to quantify. However, the cost of blocked funds in excess of the optimum cost is computed in terms of inventory carrying cost discussed below.

2.3.2 Carrying Cost

The second major cost contributor is carrying cost. Funds invested in inventory attract interest charges on working capital borrowed from the bank. The current bank rate of interest on working capital borrowing is 12-15 percent. Thus, the interest charges investment on excess inventory will erode the bottom line.

2.3.3 Ordering Cost

This refers to the cost involved in the ordering process. The paperwork, faxes, phone calls, and so on will add to the inventory related cost.

2.3.4 Warehousing Cost

This is the cost for product holding in the warehouse. Depending on the kind of warehouse (private, public or contract), there will be a cost related to space occupancy based on the duration of storage. This cost varies from 1.5 to 4 percent and may be taken into consideration while computing inventory related costs.

2.3.5 Damage, Pilferage and Obsolescence Cost

Material stored carries the risk of damage, shrinkage and loss of weight. A product also carries the risk of pilferage or obsolescence due to technology change or availability of substitutes. The percentage varies from 0.5 to 2 percent depending on the product.

2.3.6 Exchange Rate Differentials

In case of imported inventories, the valuation is done based on the current currency exchange rates in the market. Any fluctuation may increase or decrease the value of the inventory. Due to exchange rate fluctuations, there is the risk of selling the material at prices lower than the landed cost.

Review Questions

I. Activity:

1. Visit a local retailer and discuss his inventory management idea to discuss in the classroom.
2. In your own house ask your mother how she manages her monthly grocery using inventory functions as a concept.

II. Question & Answer:

1. Write down the important functions of inventory.

III. Write True or False against each statement:

1. For seasonal products the demand is at its peak for a certain period while it is lean for the rest of the year.
2. Inventory helps to keep a tough flow of products across the supply chain.
3. Raw materials, components are parts required for producing finished goods.



2.4 Inventory Controls

The variability in customer demand if not conveyed properly or conveyed with distortion as it travels upstream in the supply chain - the phenomenon is called 'bullwhip effect' - causes either stock outs or inventory pile-ups in the distribution logistics chain. The bullwhip effect is a deformation in information when it goes upstream in the supply chain. The ripple effect of demand volatility results in inventory problems impacting on profitability and customer service of the firm. This happens due to lack of smooth and speedy information flow, resulting in improper coordination and synchronization of actions of supply chain partners.

More precisely, the demand of the customers is put out of shape each time it goes from a one decision point to another. Assuming the demand of the customer is quasi-constant, this deformation appears through the amplification of the first mini-fluctuations. Problems tend to escalate in supply chains where communication is minimal between the supply nodes. The situation can be compared to the small wave in the middle of the ocean that may end up as a tidal wave near the shore.

Review Questions

I. Write True or False against each statement:

1. Inventory blocks funds, funds once blocked cannot be invested in any other productive activities.
2. Carrying cost is involved in the ordering process.
3. Funds invested in inventory attract charges on working capital borrowed from the banks.
4. Warehousing cost is the cost for product holding in the warehouse.

II. Question & Answer:

1. Explain in brief, the different inventory cost used in inventory management.

III. Activity:

1. Visit a small manufacturing unit in your city / town to collect the different inventory cost data of its product so that it can be discussed in the classroom.

2.4.1 Selective Control Techniques

In these methods the degree of control varies with the importance of the item in the supply chain. The following are the various methods in practice that are commonly used in industries.

2.4.1.1 ABC Analysis

This relates to the annual usage cost of a particular item. A detailed analysis of inventory may indicate that only 10 percent of items generally account for nearly 70 percent of usage value. Another 20-30 percent of items may account for 20 percent of usage value and the balance 60-70 percent account for the remaining 10 percent of usage value. The items are classified as per the usage value. While items in class A are less in number, they cost approximately 60-70 percent of the total cost of the inventory. Class B items cost 20-30 percent of the total inventory cost, whereas class C items are in greater numbers, yet carry less than 10 per of the cost of the entire inventory. In short, this is a financial evaluation for ranking and comparison of inventories. The objective of the classification is to know which item should receive the most attention. An item in class A should have your perpetual attention, while a class C item may be reviewed with less periodicity than class B items.

The ABC inventory classification method is thus used to categorize inventory into groups

based upon certain activity characteristics. It is the process of classification of products as per the level of importance in terms of their relative criteria such as purchase or sales volume. Examples of ABC classification include:

- ▶ ABC by velocity (times sold)
- ▶ ABC by sales in rupees
- ▶ ABC by quantity sold or consumed
- ▶ ABC by average inventory investment
- ▶ ABC by margin

ABC classification is used to develop inventory planning policies, set count frequencies for cycle counting slot inventory for optimized order picking and other inventory management activities. It can be described as a technique that is used in a business sense for denoting a categorization of a large volume of data into groups. These groups thereafter can be marked as A, Band C. This means that activities that are considered high on priority are classified as A, those with a lesser priority are grouped under B and the group of activities that are last on the list of priority are classified as C.

ABC Analysis Template					
www.Planning-Templated.com					
A = 70% (7 Items), B = 85% (6 Items), C = (37 Items), Total 50 Items					
Item	Consumption Qty	Cost/Unit	Amount	Acc Amount	ABC Class
R-005	5,200	320.00	1,664,000.00	1,664,000.00	A
R-041	5,000	200.00	1,000,000.00	2,664,000.00	A
R-036	2,000	325.00	650,000.00	3,314,000.00	A
R-016	2,000	320.00	640,000.00	3,954,000.00	A
R-008	2,500	200.00	500,000.00	4,454,000.00	A
R-050	2,346	200.00	469,200.00	4,923,200.00	A
R-014	1,400	325.00	455,000.00	5,378,200.00	A
R-030	2,000	200.00	400,000.00	5,778,200.00	B
R-025	900	325.00	292,500.00	6,070,700.00	B
R-032	4,500	50.00	225,000.00	6,295,700.00	B
R-024	2,000	100.00	200,000.00	6,495,700.00	B
R-003	450	325.00	146,250.00	6,641,950.00	B
R-009	3,000	44.00	132,000.00	6,773,950.00	B
R-013	1,300	100.00	130,000.00	6,903,950.00	C
R-027	400	320.00	128,000.00	7,031,950.00	C
R-019	600	200.00	120,000.00	7,151,950.00	C
R-010	2,000	50.00	100,000.00	7,251,950.00	C

Figure 2.8: ABC Technique to Control Inventory



2.4.1.2 VEO Analysis

This relates to Vital, Essential and Desirable status of the inventory item. As the term implies, certain parts and items are considered to be vital for meeting operational requirements and this aspect is taken into consideration while making the forecast.

The modified version of this is ABC-VED analysis that takes into consideration both value and the critically of the item. High-value and critical items are under continuous review and ordered in low quantities, while low-value, least critical items are periodically reviewed and ordered in large quantities with lower safety stock requirements.

2.4.1.3 SAP Analysis

Scarce, Available and Plenty status of inventory item is used for planning & forecasting of inventory requirement. The ordered quantity is governed by the scarcity factor. The limitations in supply or obsolescence of an item in the near future will be guideline for procurement policy decision.

2.4.1.4 FSN Analysis

Fast, Slow or Normal determines the consumption pattern of an item. However, a consumption pattern where the production run is slowed down for various reasons may not give a realistic picture for procurement action.

In all these control techniques, the degree of control varies with the importance of items. For example, for the A class vital, scarce and fast-moving items perpetual reviews are recommended, while for B class essential, medium-moving items periodic reviews will be OK. In the case of C class desirable, slow-moving items and the periodicity of review will be longer.

Review Questions

I. Question & Answer:

1. Discuss various selective control techniques used to manage inventory.

II. Write True or False against each statement:

1. ABC relates to the annual usage cost of a particular item.
2. VED analysis relates to valuable, easy and demanded status of the inventory items.
3. SAP is understood as the ordered quantity governed by the scarcity factor.

2.5 Case Study

When Toyota decided to set up the plant to deliver in MUV Quails, it had realized the price sensitivity of the Indian auto market dominated by Mahindra & Mahindra and Tata. It was a challenge to produce vehicles at a competitive price. Toyota observed the logistics cost of

the Indian Auto Industry and decided to use this weapon against competitors. Mitsui & Co provided complete logistic solutions to Toyota world-wide. This company decided to implement the JIT concept in India for Toyota and to achieve this they found a partner in TCI Ltd. and a new company was born "Transystem Logistics International Ltd".

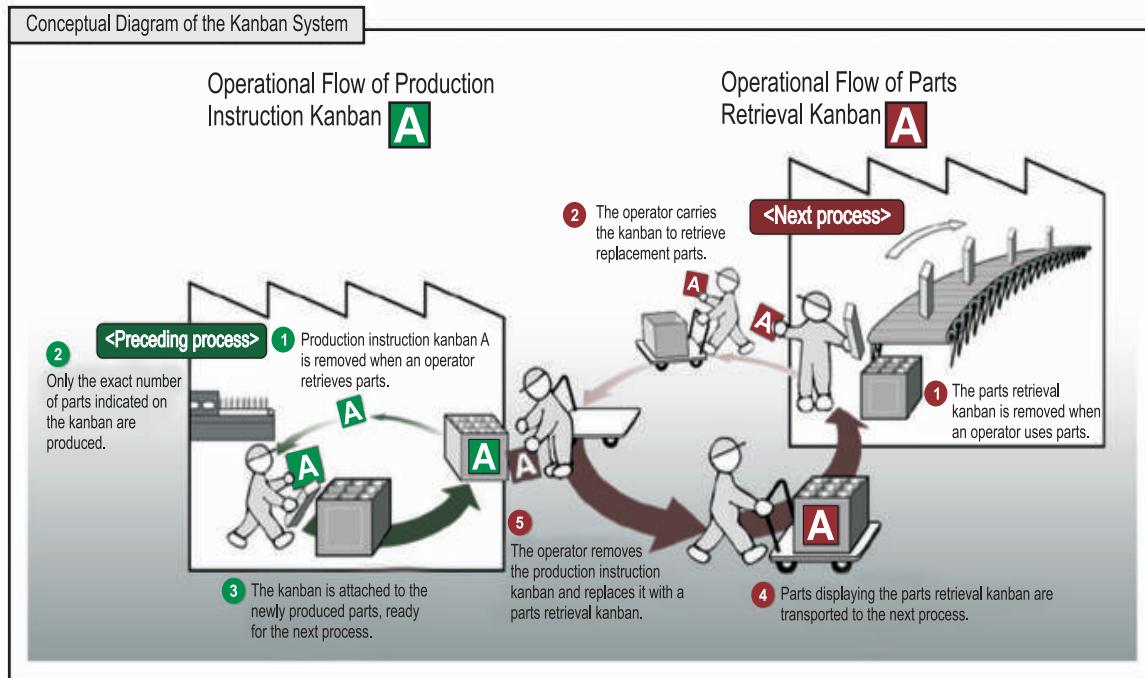


Figure 2.9: Kanban-A Japanese Technique to Manage Inventory in Production

Toyota implemented JIT inventory management wherein it receives its supplies from its vendors spread all over the country on a daily basis. It uses the 'mixed loading' concept, where a single truck is loaded with all components supplied by different vendors, considering the daily production requirements. As a result, the company is able to run almost zero inventories for its production line. It has also managed to do away with the uncertainty in transportation by appointing a dedicated transporter for the overall movement. The TRM supply chain is characterized by:

- ▶ Collection of material through "milk run" across all vendors located in different parts of the country at hub centers where checking, consolidation and stacking is done.
- ▶ Main route vehicle moves from the hub to the TRM plant carrying all 'milk run' collection.
- ▶ Bulk movement is direct from vendors to the TRM plant.
- ▶ All vehicles run as per a predetermined time schedule.
- ▶ Vehicles are provided with a hydraulic loading ramp.
- ▶ All drivers give status calls twice daily about their location. In case of an eventuality, they seek instructions to ensure goods reach on time.

Toyota Logistics System being operated through TRANSSYSTEM had lead to reduce average inventory level just under two days (as compared to 30 days), zero-defect delivery 99.8 per cent on time and reduced to customer plus a quality service that helps the company to build long-term relations with their customers.

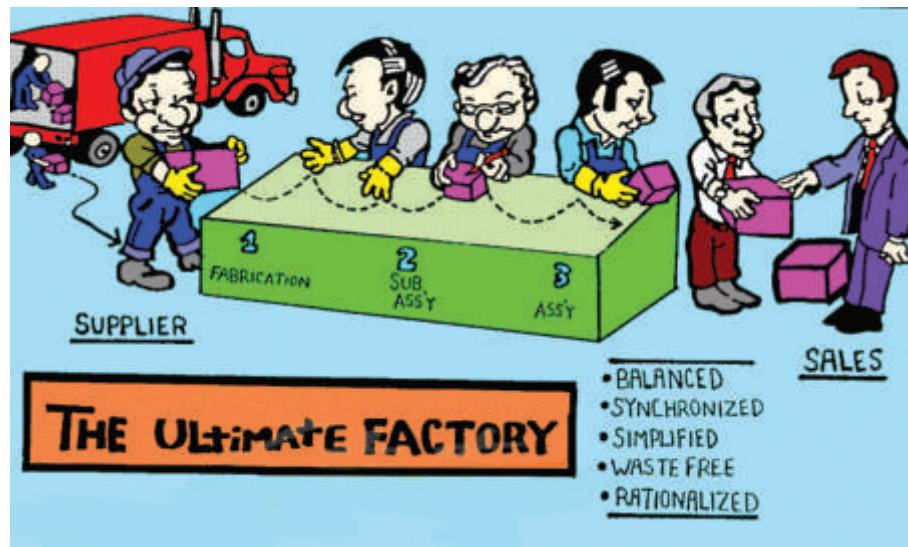


Figure 2.10: Supply Chain of Inventory in a Factory

2.6 Summary

The unit discusses inventory management and its relation with supply chain. Inventory is considered as asset or liability. it has been explained and understood through inventory functions and different cost. The unit also explains the inventory control technique and its types.

2.7 Exercise

1. Is Inventory an asset or liability? Discuss.
2. What is the function of inventory? Explain.
3. Write down the different types of inventories that are held at the various stages of the supply chain of a company.
4. How do manufacturer of any product manages inventories in his set-up?
5. Discuss what are the important inventory functionality?
6. Why do inventories are carried? Give reasons.
7. Discuss the cost components involved in carrying and holding the goods.
8. ABC, VED are selective control techniques used to improve inventory management. Explain.

2.8 Practical

1. Discuss the case study of Toyota Kirloskar Motors Ltd. in the classroom and tell students how to improve inventory management.
2. Visit a warehouse of any product in your city / town and prepare a note on inventory cost involved in the product so that it can be discussed in the classroom.
3. Visit a Pharma Store and prepare a note on selective control technique like ABC & VED used by the store for its product to discuss in the classroom.



UNIT 3

Freight Management

- 3.0 Unit Overview & Description
- 3.1 Freight Management
- 3.2 Transportation Networks
- 3.3 Containerization
- 3.4 Logistical Packaging for Cars
- 3.5 Summary

3.0 Unit Overview & Description

The unit is prepared to provide the idea of freight management and selection of transportation mode. It also helps to understand transportation network route planning. It is also giving idea of containerization, factors for its growth and types. To provide better understanding of packaging, unitization principle is discussed, where as material used for logistical packaging is also explained.

Knowledge and Skill Outcomes

This unit is expected to impart the following Knowledge and skill:

- ▶ Understanding of freight economy.
- ▶ Awareness relating to factors influencing freight cost and route planning.
- ▶ Provides exposures to containerization its scope, types and uses.
- ▶ Enable to know packaging for safe product handling during logistic operation.
- ▶ Understand to know the kind of product used for safe packaging.

Resource Material

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3. Donald J. Bowersox and David J. Closs, Logistics Management: The Integrated Supply Chain Process, TataMcGraw Hill Publishing Company Limited, New Delhi (2004).
4. Coyle, John Edward, J. Bardi and C. John Langley, Jr., The Management of Business Logistics: A Supply Chain Perspective, Mason OH South Western Thomson Learning (2013).

Learning Outcomes

Unit III	Freight Management	Outcomes
3.1	Freight management.	Discuss the factor influencing freight cost, route and planning.
3.2	Transportation networks.	How do safe packaging take place while handling products during logistic operation.
3.3	Containerization.	Explain the meaning of containerization.
3.4	Logistical packaging for cars.	Understand packaging material.

Assessment Plan

Unit III	Topic	Assessment Method	Time Plan	Remarks
3.1	Freight management.	Exercise: Q & A, T or F		
3.2	Transportation networks.	Exercise: T & F Statements, Q & A		
3.3	Containerization.	Exercise: T & F, Activity		
3.4	Logistical packaging for cars.	Exercise: T & F, Q & A		



3.1 Freight Management

The selection of transportation mode depends on the product characteristics and customer service requirements. For example, raw materials are invariably transported in bulk and through cheaper mode of transportation such as rail or sea. The unit value being less, the transportation cost, as percentage of the value of material being transported, is very high. Hence freight reduction through scale economics becomes necessary. However, in case of high-value items, the deliveries required are faster and in smaller consignment with reliability. In this case, with the unit product value being high, the transportation cost as percentage of the product value is not so significant. Hence, faster and costly modes of transportation such as road or air are preferred.

For the logistics manager cost, speed and reliability are the most important factors to select from the available transportation options. The operating characteristics of different transportation modes are given under following heads.



Figure 3.1: Different Transportation Mode

3.1.1 Speed and Availability of Service

Speed of the service is dependent on the time taken to move products from one facility to another and finally to the customer. Speed is often more important than the cost of the service. The slower modes of transports involve lower transportation cost, and they result in lower service levels. The availability depends on the existing transportation infrastructure and the ability of the mode to serve the given pair of locations. This sometimes becomes a major constraint in speedy delivery and necessitates the usage of inter-modal transportation.

3.1.2 Product Handling

For handling the heavy as well as odd-shaped cargo, special material handling equipments are deployed. These equipments are not available at loading or unloading points because of very low frequency (at the time of project installations only) of usage. Hence, these equipments have to be organized specially. This adds to unit transportation charges of the product.

Review Questions

I. Write True or False against each statements:

- a) The selection of transportation mode depends on the product characteristics and customers service requirements.
- b) For logistics manager cost, speed and reliability are the least important factors to select from transportation options.
- c) Speed is often less important than the cost of the service.
- d) For handling the heavy as well as odd-shaped cargo special material handling equipments are deployed.
- e) Movement of goods is done through various modes of transportation.

II. Question & Answer:

1. What do you mean by Freight Management?
2. Write down the important factors to select transportation options.

III. Activity:

1. Visit a travel company in your city / town and collect the data of the cost of different routes used for travel purpose and discuss it in the classroom.



Figure 3.2: Sea Freight



3.2 Transportation Networks

Movement of goods from the point of production to the point of consumption is done through various modes of transportation. Depending on the transportation load, number of delivery points, existing distribution centres, product value, frequency of delivery, urgency and the cost economics, different types of networks are used.

3.2.1 Point-to-Point Network

Point-to-Point types of network is quite common for long distance hauls on the national highways. The points of origin and destinations are fixed. Complete truck loading is assured for both ways.

3.2.2 Multiple Delivery Points

Multiple delivery points network is used for round the trip operations, with multiple pickup and delivery points. For example, the delivery of filled bottles and pick-up of empty bottles of soft drinks at multiple points on the fixed route is quite common.

3.2.3 Transhipment Point

Transshipment Points are two local area networks having a common point where loading and unloading takes place for freight consolidation or break bulk. Most of the national transporters maintain two types of fleet, that is vehicles dedicated for national long distance haulage and other ones for catering to local network. The consignment from long distance fleet is transshipped to local vehicles for distribution across the local area.

3.2.4 Hub and Spoke Network

Hub and spoke network arrangement is like a hub and spoke of the wheel. The hub acts like a central feeder point to the distribution centers, which are at the strategic locations spread across the geographical area. The high volume and high speed shipment takes place from hub to distribution centers through the predetermined shortest routes called spokes. The transshipment of consignment is done at distribution centers for distribution across the local area.

3.2.5 Route Planning



For the conservation of precious fuel and saving the transportation time, route planning may be advisory or statutory. The advisory routes are those with less operational problems and shortest distance. The cost of operation of the truck on such routes is the lowest. These are basically national or state highways connected to the markets and traffic on such routes is also high. These are very attractive for the truckers because of the immense opportunities for the return freight business. The statutory routes are those, which legally prohibit a trucker to use the routes other than the designated ones. The statutory routes are designated for carrying the particular type of goods such as explosives, hazardous chemicals or inflammable materials. The other categories of routes are those used for high productivity vehicles, high speed vehicles or extra heavy vehicles. The statutory routes are common in developed countries and quite uncommon in India.

The main objective of route planning is to cover the distance between two points with the shortest distance, ensuring operating economy resulting into lowest transportation cost. To plan a route for a truck for multiple pickups and delivery points, spread over a vast geographical area, is a challenging task. The planning task becomes complicated in case of perishable commodity having short shelf life. Generating distance matrix, which is a one time exercise, and generating the route matrix with nodes for pick-ups and delivery can solve the problem. The other factor is duration of travel in case of perishable products.

Review Questions

I. Question & Answer:

1. Discuss the types of transportation network used in the movement of goods from the points of production to the point of consumption.
2. Write down the main objective of route planning.

II. Write True or False against each statements:

- a) Point to point types of network is quite common for long distance hauls on the national highways.
- b) Multiple delivery points network is used for single trip operation.
- c) Hub and spoke network arrangement is like a hub and spoke of the wheel.
- d) Route planning is advised for the conservation of precious fuel.

3.3 Containerization

Containerization is making waves in the transportation of goods, ensuring manifold benefits to the users, transport companies and the country's economy. A container can be defined as a transport device for moving solid or liquid material. It is a case or a tank with adequate strength to be repeatedly used for packing and transportation of the material. The container can be used on several transport modes without material being stuffed, de stuffed or transshipped.



Figure 3.3: Container Boxes





Figure 3.4: A Clear View of a Container

Today containerization is an accepted trend in shipping for international and domestic trade. Initially containers were used for sea transportation, but are now profusely used in inland transportation. It was Malcolm McLean, owner of a huge trucking company in the USA, who conceived the idea of containers in 1956. Containerization in shipping started in the 1960s; the first container shipping being 'Hawaiian Citizen'. It defined the system of port management with vision and strategic planning and developed sophisticated handling facilities. Since then, the container traffic has grown in leaps and bounds, and more than 200 million TEU of 20 ft container were handled world over in 2000-1. This is expected to grow to 417-491 million TEUs by 2001-02, with largest growth being expected in Asia. Globally, containerization is expected to grow at 5 percent in the next 10 years and in Asia at 8-10 percent.

Ports and shipping industry world over has accepted the containerization is the future of shipping and initiated projects for keeping pace with the latest developments. The ship builders have already started building huge container carrier cargo ships having capacity of more than 6000 TEUs. The ports are also gearing up to meet these challenges. Some port such as Heliex, Canada, have already taken action to deepen the container birth for maintaining the draft of at least 52 feet to receive ships with 8000 TEU or above. The containers used for movement of solid cargo are box type construction with side or top opening with twist locking system. These are normally water and air tight constructions using steel or aluminium alloy, and are built as per International Standard Organization (ISO) having common sizes as indicated.



Figure 3.5: Ship With Container Boxes



Figure 3.6: Open View Container

3.3.1 The Factors that Contributed to the Growth of Container Traffic are:

- ▶ Integration of various modes of transportation - Possible Inter-model transportation.
- ▶ Elimination of cargo transshipment leading to speedier delivery service.
- ▶ Possible door-to-door service to customers.
- ▶ Reduced risk of transit damage and pilferage.
- ▶ Substantial reduction in logistical packaging cost of the goods.
- ▶ Reduction in distribution cost.

During these days of cost optimization, every stage of physical distribution has considerable significance. This significance gets further augmented with variations in distribution channels, handling methods, modes of transport, transshipments, storage conditions and extremes of environment. As the distribution aspects of the products are influenced by the above factors, the design of logistical packaging should interface effectively with all the concerned functional areas and ensure itself to adapt to material handling system available. It provides optimum cubic capacity utilization of warehouse area and carrier, convenience of inventory keeping and fulfills the basic need to minimize the chances of product damage. Logistical packaging is appropriately identified as an aid in the distribution network. It has to qualitatively and quantitatively fulfill the required expectations and also be environmentally responsible.

Review Questions

I. Write True or False against each statements:

1. A container can be defined as a transport device for moving solid or liquid material.
2. Today containerization is a rejected trend in shipping for international and domestic trade.
3. Malcolm McLean conceived the idea of containers in 1956.
4. Helix is a port situated in U.S.A.
5. Possible door to door service is an important factor to contribute to the growth of container.

II. Activity:

1. Visit a transport company in your city / town to find the types of containers used by it in its trade and discuss in the classroom.



Container Specification

Type of Container	Interior Dimension (mm)	Door Opening (mm)	Load Capacity (m ³)	Cargo Loadable (m ³)	Max Payload (Kg)	Container Weight (Kg)	Max Gross (Kg)
20 FT DRY CONTAINER	L: 5,897 W: 2,348 H: 2,385	W: 2,337 H: 2,272	33,0		28,190	2,290	30,480
40 FT DRY CONTAINER	L: 12,301 W: 2,348 H: 2,385	W: 2,337 H: 2,272	67,4		26,710	3,770	30,480
40 FT ALUM. DRY CONTAINER	L: 12,057 W: 2,344 H: 2,382	W: 2,337 H: 2,280	67,3		27,530	2,950	30,480
40 FT H.C. DRY CONTAINER	L: 12,031 W: 2,348 H: 2,690	W: 2,337 H: 2,577	76,0		26,490	3,990	30,480
45 FT H/C DRY CONTAINER	L: 13,555 W: 2,348 H: 2,690	W: 2,337 H: 2,577	85,6		25,600	4,880	30,480
40 FT ALUM. REFEER CONTAINER	L: 11,556 W: 2,290 H: 2,238	W: 2,290 H: 2,204	59,2	55,3	27,960	4,520	32,480
40 FT H/C ALUM. REFEER CONTAINER	L: 11,585 W: 2,290 H: 2,527	W: 2,290 H: 2,491	67,0	64,3	28,340	4,160	32,500
40 FT H/C STEEL REFEER CONTAINER	L: 11,583 W: 2,290 H: 2,538	W: 2,290 H: 2,508	67,3	63,3	27,700	4,800	32,500
20 FT STEEL REFEER CONTAINER	L: 5,455 W: 2,290 H: 2,262	W: 2,290 H: 2,227	28,3	26,4	21,040	2,960	24,000
20 FT OPEN TOP CONTAINER	L: 5,898 W: 2,346 H: 2,354	W: 2,338 H: 2,244	32,6		21,550	2,450	24,000
40 FT OPEN TOP CONTAINER	L: 12,022 W: 2,346 H: 2,381	W: 2,337 H: 2,244	66,4		26,460	4,020	30,480
20 FT FLAT TRACK CONTAINER	L: 5,958 W: 2,018 H: 2,077		25,0		27,760	2,720	34,00
40 FT FLAT TRACK CONTAINER	L: 11,986 W: 2,236 H: 1,968		52,7		39,020	5,980	45,000

Figure 3.7



Figure 3.8: Different Forms of Packaging



Figure 3.9: Juice in Tetra Pack

3.3.2 Consumer Versus Logistical Packaging

Packaging is a marketing tool and is related to the performance of marketing function. It is primarily a delimitation of space and setting aside of a product from external environment. Packaging forms the important cost element of the goods and represents 5-30 percent of the value of the goods depending on the product type. Packaging can be divided into two categories, that is consumer and logistical packaging. The consumer or product packaging is basically done for convenience, market appeal and protecting the product from the effects of natural elements. However, logistical or industrial packaging is a very critical element in the physical distribution process. Product packaging is designed to meet marketing objectives, but logistical packing is designed while keeping in view the distribution objectives.



3.3.3 Packaging as Unitization

The physical distribution process involves storage, handling and transportation of the product during its journey from manufacturing plant to the end customer. For ease in distribution process, individual products are grouped together in quantities to form a package which can conveniently moved in the distribution system. This process of grouping large number of products in convenient packs is called unitization.

For consumer goods, unitization commonly proceeds to quantities closely related to the need of the consumers and the channel members. They are put in a master carton, bin or box. However for logistical packaging the individual products (depending on size) or master cartons are further grouped together and put into the wooden crate or container for ease in

transportation, storage and handling. Processed food, automotive parts and consumer items are unitized in numbers, weights and volumes depending on the purchasing needs of the customers. The unitization of load plays an important role in enhancing the efficiency of the logistical system. The unit load may be stored, transported and handled with mechanical equipment during its journey from place of dispatch to the place of final delivery. The most common method of unitization is the use of containers.

3.3.4 Containers

The ultimate unitization upward is being developed under the concept of containerization. The containers are devices in which individual items or master cartons are placed during transportation activity. The purpose of providing the box container is to protect the products or the master cartons from damage during transportation, storage and multiple transshipment handling. This is the most common method of load unitization for long-distance shipments because of the following reasons:

- ▶ Excellent protection from environmental effects.
- ▶ Space economies.
- ▶ Substantial reduction in transit damages.
- ▶ Reduction in pilferages.
- ▶ Facilitate inter-modal transportation.

3.3.5 Pallets

Another method of load unitization is stacking individual products or master cartons on the pallets and tightly securing them with metal straps or shrink films. Handling of pallets is done with forklift truck. Pallets packaging does not give complete protection to the product from the environmental effects.

Palletization offers tremendous advantages in transportation and handling of the goods. The pallet gives better stability to goods during transportation in terms of damage protection as compared to individual handling of the master cartons. It enhances the productivity of the logistical system and reduces the cost of handling. Due to the standardization of pallet sizes conforming to the international standard, loading and unloading operations have become very easy. There are two-way or four-way entry pallets, the choice of which depends on method of storage, handling and transportation. The two-way pallets are handled by forklift from two sides, while four-way pallets have greater flexibility in being handled by forklift.

3.3.6 Slip-Sheet

Unitization of load is also done on the slip-sheet, which lies flat on the floor. It is a disposable shipping platform constructed out of high-tensile laminated paper. The sheet is much thinner than the wooden pallet. It cannot be lifted with forklift. However, it requires a special lifting device known as push / pull attachment. The device is designed to grip the tabs of the slip-sheet to lift it and load on to the metal plates that support the load during transportation.

Sizes of slip-sheets are similar to the pallets sizes as indicated earlier. However, the product characteristics, capability of handling equipment and the type of transportation equipment will be the deciding factors for unit load platform size.

3.4 Logistical Packaging for Cars

For safe dispatch of the Maruti cars, the company first used side open trailer, accommodating 11 cars. They found damages caused to the cars by miscreants and also cars hitting each other due to lesser distance between the bumpers. The system was modified by providing side grills to the trailer and reducing the number of cars to 10. Not satisfied with the modification, company introduced TR-7 truck, a two-in-one customized logistical packaging arrangement and transportation mode. TR-7 truck carries seven cars and is equipped with self-unloading ramp and stoppers in between the loaded cars to avoid collisions during transportation. For shipment of cars for export, the company used box containers, which used to bring parts and components from foreign suppliers to the factory. The use of containers bringing imported material was a zero cost option for export shipment resulting into substantial saving on the transportation cost.

3.4.1 Packaging Material

For logistical packaging variety of materials are in use., However the most common are follows:

Corrugated Fibreboard

The matter cartons are invariably made out of two to three ply corrugated sheets. However, for logistical packaging, thicker corrugated sheets with five to six ply or more are preferred. This material is most commonly used for consumer durables such as television sets, washing machines, refrigerators, pharmaceutical products, liquor, cigarettes, matches, personal care items, light engineering goods, paints and electronics goods. The pallets are also made out of thin corrugated sheets. However, these pallets are used for very light goods in electronic, plastic and foam manufacturing industries.

The present consumption of corrugated boards in India is to the tune of 3,20,000 tonnes per annum, which is divided among above industries. Largest consumer is the food processing industry.

Review Questions

I. Write True or False against each statements:

1. Packaging is a marketing tool.
2. Packaging can be divided into one category.
3. The physical distribution process involves storage, handling and transportation of the product.



4. Handling of pallets is done with fork lift truck.
5. The matter cartons are invariably made out of two to three ply corrugated sheets.

II. Question & Answer:

1. Write down the types of packaging material used for packaging.

Steel

The metal containers- boxes or drums made out of galvanized mild steel sheets are used for logistical packaging. This strong material can withstand abuse in handling during transit. The usage of this material is recommended for products like chemicals or lubricants wherein strong packaging material, which is less prone to damages during transit due to abuse in handling, is required. Due to higher strength of material, the spilling over or leakages are reduced.

Steel is commonly used for box containers used in multi-modal transportation by sea, rail or road. These containers are made out of thick alloy steel grade sheets for durability and high strength.

Plastics

Plastic bags and containers are quite common in logistical packaging. Plastic drums are used for transporting liquid chemicals, while bags are used for chemicals in solid form and food grains packaging. The high-density plastics are used for rigid lidded containers for storage and transportation of small items. Plastic straps are used for unitizing the material in small packs to be stuffed into a large box container.

Shrink plastic are used for securing and protecting the unitized load on the pallets or skids. Shrink packaging is very cost-effective as compared to the rigid plastic containers. However, it is not reusable and being non-biodegradable material creates problem for disposal.

The pallets made out of high-density polyethylene (HDPE) are commonly used in application wherein properties of chemical and impact resistance are preferred. However, polyethylene has very poor resistance to bending. Polystyrene or polypropylene is also occasionally used for certain product applications.

Wood

Wood is the most common material used for construction of pallets or crates. The pallets are designed to take loads up to 2,200 kilogram using hard wood. Soft wood may be used for weight carrying capacity up to 2,000 kilogram. The wooden pallets are cheaper as compared to metal or plastic pallets.

Globally, wooden pallets are preferred and used for both in house and shipping application. Investment in pallets is a costly affair and hence is used on a limited scale. In many cases,

the users and the pallet supplier create pallet pool for reusing the pallets, and thus reduce the recurring investment and resolve the problem of waste disposal.

To survive in today's competitive markets, companies are focusing on their core competencies and adopting outsourcing as a strategic solution to improve quality of service and reduce cost of important as well as non-core processes. Using the strategic partnership of third-party logistics service providers, in integrated logistics, companies the world over reported gains such as reduction in logistics costs, logistics assets and order cycle time. Today, it is an accepted trend in the industry to form a collaborative relationship with the logistics service provider for knowledge based supply chain integration that rests on IT as the backbone.



Figure 3.10: Corrugated Board



Figure 3.11: Medicine Packaging in Bottles

3.5 Summary

The unit discusses the freight management which includes selection of transportation mode, transportation cost. It also tells about the different types of transportation networks. The other aspects like route planning and movements of goods through containers is also elaborated with reasons. Unit also focused on packaging of different goods which is readily used in logistical purposes.

3.6 Exercise

1. What do you mean by freight management?
2. Write down the important factors used to select the transportation options in logistics.
3. Discuss the different transportation networks for the movement of goods.
4. Why do we need route planning? What is its objective?
5. What is containerization process? Discuss the factors contributing in the growth of containers?
6. Write down the different types of containers.

7. Why logistical packaging is so important?
8. For what purpose packaging is called as load unitization?
9. Explain in brief the different material used for packaging.

3.7 Practical

1. Visit a packaging company in your city / town and prepare a note on material used in making different package to discuss in the classroom.
2. Collect pictures of different containers through various media and paste in a file. Discuss it in the classroom telling its utility.
3. Prepare a note on different types of packets found in home while buying goods and discuss the material used in making it.



UNIT 4

Logistics Management and Information Technology

- 4.0 Unit Overview & Description
- 4.1 Information Technology and Logistics
- 4.2 Consignment Note
- 4.3 Sea Borne Trade and Ports in India
- 4.4 Summary

4.0 Unit Overview & Description

The unit is expected to provide information about Information Technology and Logistics, use of information technology in logistics, different latest technology. It also helps to understand about the kind of documentation used in domestic and international trade cargoes including international chamber of commerce term. Moreover, the unit also provides information about sea borne trade, ports and ships management in India, logistics and supply chain uses in world industry.

Knowledge and Skill Outcomes

The unit is expected to impart the following knowledge and skill:

- ▶ Exposure to information technology and logistics.
- ▶ Understanding the use of domestic and international trade cargoes documentation.
- ▶ Develops awareness relating to INCO -International Chamber of Commerce Terms.
- ▶ Provides exposure to sea borne trade and ports and ships management in India.
- ▶ Helps to understand logistics and supply chain uses in world industry.



Resource Material

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3. Sople, Vinod V., Logistics Management: The Supply Chain Imperative, Pearson, New Delhi (2010).
4. Muthiah Krishnaveni, Logistics Management and World Sea Borne Trade, 2nd Edition; Himalaya Publishing Books, New Delhi (2001).
5. Reji Ismail, Logistics Management, Excel Books, New Delhi (2008).

Learning Outcomes

Unit IV	Logistics Management and Information Technology	Outcomes
4.1	Information technology and logistics.	Explain relation between logistics and information technology.
4.2	Consignment note.	Discuss the new terms of technology in logistics. Write down important documents used in domestic and international trade cargoes. Discuss the different international chambers of commerce terms.
4.3	Sea borne trade and ports in India.	What is the importance of sea borne trade. Discuss ports and ship management. Write down the utility of logistics and supply chain in world industry.

Assessment Plan

Unit IV	Topic	Assessment Method	Time Plan	Remarks
4.1	Information technology and logistics.	Exercise: Q & A, Match the following, T & F		
4.2	Consignment note.	Exercise: Q & A, Match the following		
4.3	Sea borne trade and ports in India.	Exercise: T/F, Fill in blanks, Match the following		

4.1 Information Technology and Logistics

It has become appallingly obvious that our technology has exceeded our humanity

- Albert Einstein

Technology is playing a major role in the operational effectiveness and efficiency of various functional areas of management. It helps in real-time information processing and analysis. As a result, accuracy and speed in material and information flow in the supply chain has increased manifold leading to productivity, effectiveness and efficiency in logistics operations.

Many new technologies in logistics are in use in the developed countries, while in India the adoption process is a bit slower. Competitive pressure is building up and the only option for

competitiveness is to go in for technology enabled operations. Latest technologies used are in the areas of:

1. Automatic Identification
2. Communication
3. Material Handling
4. Facility Design

The World Wide Web is responsible for a transformation of the global economy and with it the supply chain management practices.

In increasingly competitive business environments, driven by customers growing demand for service, speed and customization, the ability to deliver becomes the key differentiator. Customers expectations have been shown to increase as their level of sophistication increases. Net result is that companies are paying far more attention to their customers need than ever before.

A second driver is technology which has enhanced the capability of companies to connect with their suppliers and customers. Leveraging the power of technology has facilitated a move toward real time visibility and optimization of the supply chain.

4.1.1 Customer -Centric Value Web Models



Figure 4.1: E-Commerce Sites



Figure 4.2: Name of Some More E-commerce Sites



Figure 4.3: Work Flow Diagram of E-Commerce



The power of the internet to deliver convergence, speed and connectivity has changed many customers expectations toward suppliers. Customer - Centric Value Web Model reveals that the internet has the ability to connect everyone, everywhere, in real time. Traditional supply chain boundaries are disappearing, to be replaced by a merging of activities and processes in areas such as manufacturing, distribution and transportation. The end result is that the traditional, liner supply chain model is being replaced by new customer centric approaches.

Customer- centric supply chain model enables:

- ▶ Global visibility of customer, product, or supply information throughout the supply chain.
- ▶ Enhanced customer relationships leading to repeat business through fast, accurate and professional customer response services.
- ▶ Flexible infrastructure and partnering.
- ▶ Analytical assessment and optimization of material movement, price, placement actions on demand.
- ▶ Co-ordinated, rapid decision making environment that synchronizes the global supply chain.
- ▶ Disintermediation diminish the involvement of certain traditional firm in the supply chain.

Contemporary Technologies

- ▶ GPRS
- ▶ Bar Coding
- ▶ EDI
- ▶ Imaging
- ▶ RF Technology

4.1.2 Automatic Identification Technology

Automatic Identification (Auto Id) is the term used to describe the direct entry of data or information in the computer system, programmable logic controllers or any microprocessors-controlled device, without operating a key board. Auto-Id includes such technologies as bar coding, radio frequency identification technology (RFID), data communication, magnetic strip and voice recognition.

Benefits of Auto-Id are many such as:

- ▶ **Accuracy:** Error-free data entry is possible ,as there is no human involvement.
- ▶ **Cost Saving:** Reliable and correct information is made available to reduce the risk element in decision making on resource allocations. The technology also facilitates economies of scale for voluminous and repetitive operations.

- ▶ **Speed:** Voluminous data can be stored, retrieved and transferred within a fraction of a second.
- ▶ **Convenience:** These technologies are user-friendly and provide ease in connectivity to a wide range of processing and controlling equipment.

4.1.3 Bar Code

Bar codes are used for identification, handling, retrieval and storage of goods in warehouses and stores. It is the most popular identification technology in many applications.

- ▶ Bar code is assigned to a particular inventory items to show its identity during storage, retrieval and dispatch.
- ▶ Bar codes are also used for communication of dispatched items for the preparation of bills by accounts departments and making periodic reports on inventory status and sales.
- ▶ It facilitates the tracking of specific items in the warehouse during inventory audit or material pick-up.
- ▶ Information that may be required generally relates to the country code, manufacturer's name, product details, date of manufacture, material content etc.
- ▶ Bars are nothing but items of information in codified form which can be decoded or read with the help of a scanner.



4.1.4 Commercial Use of Bar code

Bar code was first used in the US supermarkets in 1952, whereas food stores used it in US on trial basis 1960. It is presently used in all industries. Besides speed, accuracy and reliability, they offer following advantages:

- ▶ Easy identification
- ▶ Reduce paperwork and processing time leading cost reduction.
- ▶ Eliminate human error
- ▶ Increase productivity of the warehouse
- ▶ Facilitate system automation

Bar codes are described by the symbologies used. Symbologies means the pattern of lines and spaces used within the bar code to represent a no. or an alphabet. There are 260 symbologies available for different applications.

The various barcode symbologies differ in the way they represent data and in the type of data they can encode. Some symbologies can encode numbers, while others both numbers and letters, and some can encode letters, numbers as well as characters i.e. ASCII Codes.

Bar code symbologies divided into three:

1. **Linear:** Consists of a single row of bars.
2. **Stacked:** Several rows of bars and spaces and can be read by a multiple ID scanner with moving laser beam.
3. **Matrix:** A polygonal array of data cells and are read from a 2D image scanner.

Scanners are used for automatic identification of the bar code.

Pattern of bars and spaces reflect the light pattern, which is converted into electronic signals to be decoded by the computer with reference to the memory file in the computer system.

- ▶ Two type of Scanner:

1. Contact Scanner-zero depth field
2. Non-contact scanner



Figure 4.4: Different Bar Code



Figure 4.5: Bar Code

4.1.5 Radio Frequency Identification

It is one of the preferred forms of auto-identification of goods in manufacturing, retailing and logistics industries. Such identification relies on storing and remotely retrieving data using device called an RFID tag or transponder. The tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification using waves. RFID tags contain at least two parts.

1. One part consists of an integrated circuit for sorting and processing information, modulating and demodulating RF signals and other specialized functions.
2. The second one is an antenna for receiving and transmitting the signal. It is also used in transportation of payments.

The payment card can be recharged with cash at an add-value machine or in the shop and can be read several centimetres from the reader.

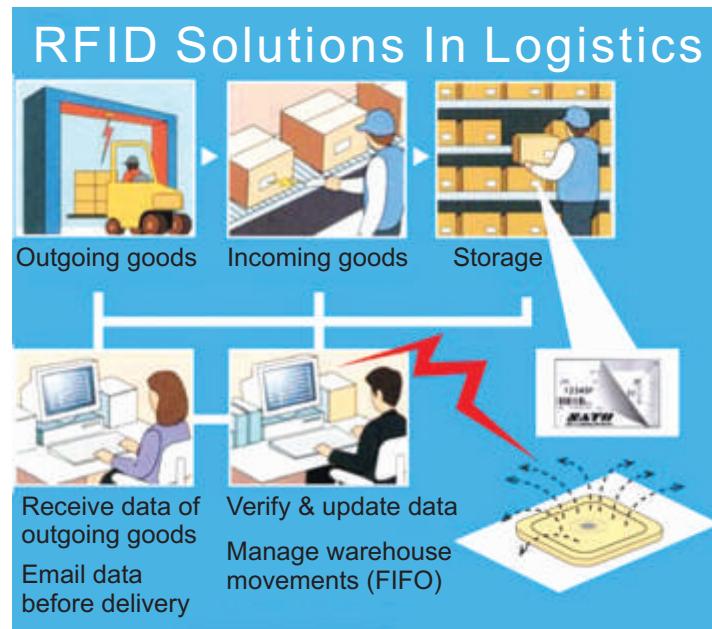


Figure 4.6: RFID and Logistics

4.1.6 Radio Frequency Tags

RFT are used as an alternative to bar codes for communicating inventory data to the readers via radio waves. The reader is connected to the central computer. RFTs are pieces of silicon chip to store data in the micro-circuit. They are programmable and have an erasable memory.

Data is stored in coded form and communicated to the reader through radio waves. RFTs are available in passive or active form.

RFTs consist of two key components, namely tags that act as data carrier and reader or antenna, which transfers information to and from tag.

The basic principle of the tag is that the antenna emits radio signals.

RFTs are very useful accompaniments to truck shipments.

The tag contains information on consignor, consignee, inventory items, quantity and value.

RFT can be helpful for quick clearances at octroi or customs post.

Review Questions

I. Write True or False against each statements:

- a) Technology helps in real time information processing and analysis.
- b) Very few technologies in logistics are in use in developed countries.
- c) The World Wide Web is responsible for a transformation of the global economy.
- d) GPRS and Barcoding is an old fashioned technology.



- e) Automatic Identification (Auto 10) is the term used to describe the direct entry of data or information in the computer system.

II. Question and Answer:

1. Discuss the role of technology in supply chain and logistics.

III. Match the following statements:

- | | |
|--|---|
| 1. Benefits of Automatic Identification is | : Used for identification stores and storage of goods in stores. |
| 2. Bar Code | : Convenience. |
| 3. Symbolologies Means | : Preferred forms of auto identification of goods in relating and logistics industry. |
| 4. Radio Frequency Identification Tag | : Used as an alternative to bar codes for communicating inventory. |
| 5. Radio Frequency Tag (RFT) | : The pattern of lines and spaces used within the barcode to represent a number or an alphabet. |

IV. Activity:

Visit to a transporter company in your city / town to know the latest technologies they are employing in their logistics operation to discuss in the classroom.

4.1.7 Domestic Cargo Documents

Documentation plays a vital role in the process of transport industries from the pick up of the consignment until it reaches in the hands of consignee.

Transport documents are issued by the transport company to the Consignor, consignee, driver or owner of the truck.

Reasons for issue of documents:

1. For accepting the consignment for transportation (C/N)
2. For Money Received(Bill)
3. For hiring the truck from the market(LHC)
4. For delivery of goods(POD)
5. For damages of consignment during the transportation (C.O.F.)
6. For payment of hired Lorry(LHC final payment copy)

Some of the important documents

Consignment Note:

It is filled up by the booking authority at the time of booking.

The consignment note is a document issued to the consignor in evidence that the goods have been received for transportation on specified terms and conditions.

4.2 Consignment Note

Consignment note is prepared in 5 copies. Each copy is distributed as follows:

1. Consignor Copy
2. Consignee Copy
3. Lorry
4. Corporate Office
5. File Copy

4.2.1 Types of Consignment Note

1. **Carrier's Risk:** Under carriers risk the company is fully responsible for any loss or damage of cargo. Even if such loss or damage is not due to the negligence yet the company is liable for such damage. The company will settle all claims made by the customer.
2. **Owner Risk:** If cargo is booked under owner risk, the company is not responsible for any damages that may have occurred. Only if it is proved that such damage was caused due to the negligence and carelessness then the company is liable for such damage.

4.2.2 Importance of CN

- ▶ On the basis of CN challan is prepared.
- ▶ It helps in receiving goods.
- ▶ Delivery of consignment is given on the basis of consignee copy of consignment note.
- ▶ It is helpful of getting insurance claim.
- ▶ It provides information about freight.
- ▶ Marking on consignment is done on the basis of information given in consignment note.



4.2.3 Goods Forwarding Note

Document is filled by the consignor at the time of booking.

Once this note is signed by the owner of the goods or his agent, it becomes a contract and both parties i.e, consignor and transporter are bound by such contract.

It is a legal document and can be present in court for evidence.

It is an offer from consignor for carrying his goods.

In this document all the particulars relating to his consignment such as value and nature of goods etc. are given.

On the basis of goods forwarding note consignment note is prepared.

4.2.4 Lorry Hire Contract

When a truck is hired from the market for transportation of goods, an agreement is entered into with the owner / driver of the truck. This agreement is called Lorry hire contract.

- ▶ **First copy used as:** Voucher for payment of advance lorry at the originating station.
- ▶ **Second copy:** Handed over the driver of the truck to take along with him to the destination.
- ▶ **Third copy:** It is sent to the destination by post / email.
- ▶ **Forth copy:** A file copy for originating station.

Advantage of LHC

- ▶ Helpful in rate computation.
- ▶ Assist in ascertaining the profit and loss for particular truck.
- ▶ It can be produced in court in case of dispute between driver and company.
- ▶ Provides information about driver, owner name, broker, rate, advance amount.
- ▶ Provides information about the vehicle, ie. RC no., fitness certificate and permits.
- ▶ Provide information about insurance.

4.2.5 Trip Contract Sheet

- ▶ This document is prepared for the movement of cargo through company own vehicle and used for accounting of expenses incurred such as diesel, unloading etc inclusive of incentive paid to driver.
- ▶ When a truck operates on a route, all truck operation activities are accurately logged on trip contract sheet.

Importance of TCS

- ▶ Truck route details

Truck operating expenses in respect of:

1. Diesel filling costs
2. Route expenses
3. Enroute expenses
4. Cargo loading / unloading details
5. Fleet portability report and performance details.

4.2.6 Route Permit

- ▶ It is document issued by the state authority. It is a kind of permission to operate the truck as per statutory regulations.

- ▶ Three kinds of route / road permit.
1. **Temporary Permit:** Issued for specific destination for a fixed duration only from state authority.
 2. **Pucca Permit:** Issued for trip within home state.
 3. **National Permit:** Issued by state transport authority for three states other than home state.

4.2.7 Truck Registration

- ▶ According to MV Act 1988-no vehicle can be driven unless it is registered and the registration mark is displayed in the prescribed manner.
- ▶ The vehicle may get registered by the registering authority in the state in which the owner has the residence or business where the vehicle is kept for this purpose.
- ▶ RC issued is valid throughout India.
- ▶ Issued for 15 years and subsequently renewed for a period of 5 years.

Review Questions

I. Question and Answer:

1. What is the role of domestic cargo documents. Discuss the type of consignment note.
2. Discuss role of route permit and lorry hire contract.

II. Match the following statements:

- | | |
|--------------------------------|--|
| 1. Consignment Note (C/N) | Once it is signed it becomes contract |
| 2. Goods Forwarding Note (GFN) | Helpful in rate computation |
| 3. Lorry Hire Contract (LHC) | Prepared for the movement of cargo |
| 4. Trip Contract Sheet | Kind of permission to operate the truck |
| 5. Route Permit | Company responsible for any loss or damage |



4.2.8 Need of Documentation in International Trade

For any business transaction, some documentation is required. In case of export trade - it is called export documentation. It is considered most cumbersome part of export marketing.

Importance

- ▶ Why is documentation so heavy in export business?
- ▶ First purpose to protect the respective interests of both the buyer and the seller.
- ▶ Buyer and seller are operating in two different countries ,the commercial practices and legal systems are different.



Figure 4.7: Consignment at Sea Port

4.2.9 Legal Issues Concerning Export Documents

All the countries of the world have enacted laws regulating export-import trade as well as movement of foreign exchange to protect their economic and social interests. There is perhaps no country in the world where movement of goods and money is absolutely free.

Under India's Foreign Trade Policy government has listed out products which either cannot be exported or can be exported after obtaining permission from the designated agencies. Compliance with all these regulations necessitates heavy documentation.

Documents are also needed for implementing trade agreements with other countries. Such documentation is linked to the claiming of export benefits. Since these benefits are to be given only to the export activity, documentary proof to this effect is required to be given by the claimant (exporter) to the disbursing authorities.

4.2.10 Classification of Documents

Export Documents can be categorised under three broad heads:

1. Commercial Export Documents
2. Statutory
3. Documents for Claiming Export Benefits

4.2.10.1 Commercial Documents

The commercial export documents also known as shipping documents are documents which are required for:

1. Physical Transportation of goods from the seller to the buyer
2. Transfer of title of goods from the seller to the buyer
3. Transfer of payment for these goods from the buyer to the seller

These documents are the outcome of certain established international commercial and banking practices and the law relating to sale of goods.

For a consignment under a CIF contract, a set of commercial documents comprises of:

1. Invoice
2. Bill of Lading / Airway Bill / Post Parcel Receipt
3. Insurance Policy/Certificate
4. Bill of Exchange

A particular shipment may necessitate additional commercial documents such as packing list.

Bill of Lading / Airway Bill / Post Parcel Receipt are transport documents required in the cases of export by sea, by air and by postal channels, respectively. Bill of lading (B/L) serves two functions. It is a receipt issued by the shipping company or its agents for the cargo received by it.

It is a document of title that will enable the lawful holder to take delivery of the goods at the stipulated port of destination.

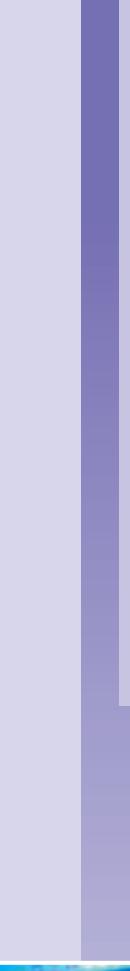
Received for Shipment B/L: Issued when the goods have been given into the custody of the shipping company but have not been placed on board the ship.

1. **On-Board Shipped B/L:** Certifies that the goods have been received on board the ship.
2. **Clean B/L:** It implies that there was no defect in the apparent order and condition of the goods at the time of receipt or shipment of goods by the shipping company.
3. **Claused B/L:** A clauded B/L bears a superimposed clause expressly declares a defective condition of the goods.
4. **Combined B/L:** It covers several modes of transport for performing the complete journey from the exporting country to the importers.
5. **Through B/L:** It covers goods being transshipped enroute but where the first carrier has the responsibility as the principal carrier for all the stages.

B/L as a Document of Title:

Normally a no. of copies of the bill of lading are issued to the exporter (shipper). Out of these two or three copies are duly signed by the master of the ship or the agent of the shipping company known as the originals. All these copies are equally valid for taking the delivery of the goods.





In air carriage, the transport document is known as the Airway Bill (AWB) or Air Consignment note. The functions of AWB are similar to B/L in regard to its characteristics as a cargo receipt. Sometimes the goods are exported through postal channels like the AWB, the PPR evidences merely, the receipt of goods and is not a document of title.

Cargo Insurance Policy

Cargo insurance policy (also called marine insurance policy) provides protection to cargo owners in the event of loss or damage to cargo in transit.

There are different types of insurance policies for different categories of risks to be covered. The prevalent practice all over the world is to fix insurance on five types of policies

1. Institute Cargo Clauses A
2. Institute Cargo Clauses B
3. Institute Cargo Clause C
4. Institute Strikes Clause
5. Institute War Clauses

Among the three cargo clauses Cargo Clauses A provide the maximum cover. It must be noted that the insurance cover is irrespective of the mode of transport.



A Bill of Exchange also known as a draft is an instrument in writing containing an unconditional order, signed by the maker (called the drawer) directing a certain person (called the drawee) to pay a certain sum of money only to a particular person or to order of a person or to the bearer of the instrument.

The exporter is the drawer and the importer, the drawee.

Two types of Bill of Exchange are:

1. **Demand Bill:** Where the payment is to be made on demand or on presentation, a demand bill or sight bill is drawn. Sight bill is drawn under DP (Document against Payment).
2. **Usance Bill:** Where the payment is to be made at a determinable future, are usance bill or time draft. In this case, the exporter gives to the importer a credit facility for an agreed time period. Usance Bill is drawn under DA (Documents against acceptance) terms of payment.

4.2.10.2 Statutory Documents

Regulatory and Official Documents:

1. Document needed from the viewpoint of the legal requirement of the exporter's country documents are grouped under four broad heads:
 - ▶ Documents pertaining to foreign exchange regulations act.

- ▶ Documents pertaining to export (Quality Control & Inspection Act).
- ▶ Documents pertaining to Indian Customs Act.
- ▶ Documents pertaining to export trade control policy.
- ▶ **ECD Form:** GR-I form is a serialised form available from the offices of the RBI. It is required to be filled in duplicate for all exports in physical form other than those made by post. The forms duly filled in duplicate is to be sent to the shipping agent along with other shipping documents.
- ▶ **PP Form:** It is required to be filled in duplicate for all exports to all countries made by post parcel.
- ▶ **SOFTEX Form:** It is required to be prepared in triplicate for export of computer software in non physical form.
- ▶ **Notified under the Export (Quality Control and Inspection) Act, 1962**, it is obligatory for an exporter to obtain inspection certificate. The scheme is administered by the Export Inspection Council (EIC) of India. Following documents are enclosed for inspection:
 1. Copy of commercial invoice
 2. ADD / crossed cheque
 3. Copy of the export contract
 4. Importer's technical specifications of quality and / or a sample approved by the importer in support of the declaration of specifications.

Under Indian Customs Act, goods cannot be loaded on board the carriers unless permission from the custom authorities has been obtained.

When goods are sent by sea or by air, the document used is known as Shipping Bill.

1. **Free Shipping Bill:** Printed on white paper.
 2. **Dutiable Shipping Bill:** Printed on yellow paper, used in case of goods subject to export duty/cess.
 3. **Drawback Shipping Bill:** Printed on green paper and is used for export of goods entitled to duty drawback.
 4. **Shipping Bill for Shipment Ex-bond:** Printed on yellow paper for use in case of imported goods for re-export which are kept in the customs bonded warehouse.
- ▶ **Application for Export:** Used for seeking customs permission to export goods to the neighbouring countries like Bangladesh by road, rail or river.
 - ▶ **Customs Declaration Form:** Customs declaration form for goods sent by post parcel is a standard form for all types of cargo.



- ▶ **Documents Pertaining to Export Trade Control Policy:** For goods that are subject to the export trade control policy of the government documents in the form of applications have been specified. On the basis of this application, an export licence / permit is granted by Joint Chief Controller of imports and exports.

This licence / permit is generally given by making a suitable endorsement on all the copies of the shipping bill.

Certificate of Origin: This document certifies that goods were mined, manufactured or assembled within a certain country and enables the importing country, thereby, to determine whether or not preferential duty rates may be levied. Certificate of origin is given by independent bodies like the Chamber of Commerce, Export Promotion Council etc who issue them against payment of nominal fees after being satisfied about the origin of goods.

- ▶ **GSP Certificate of Origin:** Under the Generalised System of preferences (GSP) the developed countries accord preferential duty treatment to specified goods originating from developing countries like India.

Through this certificate, these countries try to ensure that the goods have not been reshipped by the exporter who has just brought them into his own country from some other place of origin which is not eligible for preference.

- ▶ **Documents Pertaining to Duty Drawback:**

The rates of drawback are divided into two categories:

1. All India Rates
2. The Brand Rates

4.2.10.3 Documents for Claiming Export Benefits

Official Documents:

No separate application is required .If an exporter wishes to claim drawback ,he should use the Drawback Shipping Bill, also known as Green Shipping Bill. The triplicate copy of the Drawback Shipping Bill automatically becomes, after shipment ,an application for the claim of duty drawback.

Documents Pertaining to Excise Duty Fund

An exporter may obtain refund of duty either way of:

1. Paying the duty and recovering it after export-known as rebate of excise duty.
2. Enter into a bond, backed by an appropriate bank guarantee, with the excise authorities, so that goods can be cleared from the factory without payment of duty otherwise known as "Export Under Bond".

Main documents prescribed by the central excise authorities are:

1. **AR-4 Form:** Is used when the goods to be exported are inspected and sealed by the central excise officer at the factory.
2. **AR-4A Form:** Is used when the goods are not examined by the central excise officer, but by the customs authorities at the port of shipment.

Main documents prescribed by the central excise authorities are:

1. GP (gate pass)-I is used when the goods are exported under the rebate of excise duty scheme.
2. GP-II is used when the goods are exported under the Bond scheme.

Review Questions

I. Question & Answer:

1. Why do we need documentation in international trade? Write its importance.
2. Write down the category in which documents are classified.
3. Discuss important statutory documents used in exporting goods.

II. Write True or False against each statements:

1. Physical transportation of goods from the seller to the buyer is a part of commercial documents.
2. Bill of lading is a transport document required in the case of export by sea.
3. There is only one type of insurance policy for different categories of risks to be covered.
4. A bill of exchange is also known as a draft.
5. An exporter does not need inspection under the export (Quality control Inspection) Act 1962.



III. Match the following:

- | | |
|------------------------------|---|
| 1. Demand Bill | A kind of insurance policy to cover risk. |
| 2. Institute Cargo Clauses A | Payment is to be made on demand. |
| 3. Usance Bill | Export Inspection Council. |
| 4. E.I.C. | time draft. |
| 5. Dutiable Shipping Bill | In case of goods subject to export duty / cess. |

IV. Activity:

1. Visit an exporter company in your city / town and get the information of the documents used by him in export to be discussed in the class room.

V. Fill in the blanks:

1. Drawback shipping bill is used for export of goods entitled to _____.
2. Certificate of origin document certifies that goods were _____.
3. Full form of GSP is _____.
4. The rates of drawback are divided into _____ Categories.
5. Draw back shipping bill is also known as _____ Bill.

The International Chamber of Commerce (ICC) is the largest, most representative business organization in the world.

It has hundreds of thousands of member companies in over 130 countries and have interests spanning in every sector of private enterprise. A world network of national committees keeps the ICC International Secretariat in Paris informed about national and regional business priorities. More than 2,000 experts drawn from ICC's member companies feed their knowledge and experience into crafting the ICC stance on specific business issues.

The UN, the World Trade Organization, and many other intergovernmental bodies, both international and regional, are kept in touch with the views of international business through ICC.

The International Chamber of Commerce was founded in 1919 to serve world business by promoting trade and investment, open markets for goods and services, and the free flow of capital. The organization's international secretariat was established in Paris and the ICC's International Court of Arbitration was created in 1923.

The ICC's first Chairman was 20th century French Minister of Finance, Etienne Cle'mentel. ICC's current Chairman is Sunil Bharti Mittal. John W.H Denton is first Vice-Chairman and Frederico Fleury Curado and Dennis M. Nally are Vice Chairman.

There are two ways to become a member of ICC:

1. Through affiliation with an ICC national committee or group.
2. By direct membership with the ICC International Secretariat when a national committee / group has not yet been established in your country / territory.

Policy and Business Practices

Commissions examine major policy issues of interest to world business. Each national committee (NC) or group may appoint delegates to represent it at meetings. Officers are appointed by the Chairman and Secretary General in consultation with NCs. Meetings of commissions are normally held twice a year. Task forces are constituted under the various commissions for a limited period to undertake specific projects and report back to their parent commission.

Some task forces may include representatives of more than one commission. ICC policies, rules and standards are prepared by specialized working bodies. Normal procedure requires policy statements first to be adopted by a commission, in consultation with national committees, and then approved by the Executive Board, before they can be regarded as official and public ICC positions.

Incoterm

The Incoterms rules or International Commercial terms are a series of pre-defined commercial terms published by the International Chamber of Commerce (ICC) widely used in international commercial transactions.

A series of three-letter trade terms related to common sales practices, the Incoterms rules are intended primarily to clearly communicate the tasks, costs and risks associated with the transportation and delivery of goods.

The Incoterms rules are accepted by governments, legal authorities and practitioners worldwide for the interpretation of most commonly used terms in international trade. They are intended to reduce or remove altogether uncertainties arising from different interpretation of the rules in different countries.

First published in 1936, the Incoterms rules have been periodically updated, with the eighth version-Incoterms 2010 having been published on January 1, 2011. "Incoterms" is registered trademark of the ICC.

History of Incoterms

The Incoterms rules started developing in 1921 with the forming of the idea by the International Chamber of Commerce. In 1936, the first set of the Incoterms rules was published. The first set remained in use for almost 20 years before the second publication in 1953.

Additional amendments and expansions followed in 1967, 1976, 1980, 1990 and 2000. The eighth and current version of the Incoterms rules "Incoterms 2010" was published on January 1, 2011.

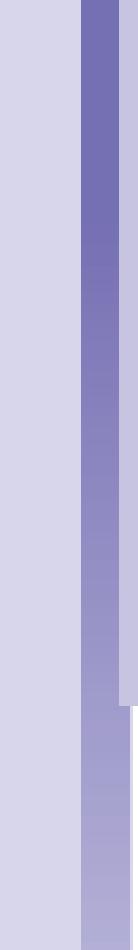
The eighth published set of pre-defined terms, Incoterms 2010 defines 11 rules, reducing the 13 used in Incoterms 2000 by introducing two new rules.

("Delivered at Terminal", DAT; "Delivered at Place", DAP) these replace four rules of the prior version ("Delivered at Frontier", DAF; "Delivered Ex Ship", DES; "Delivered Ex Quay", DEQ; "Delivered Duty Unpaid", DDU).

Incoterms 2010

In the prior version, the rules were divided into four categories. But the 11 pre-defined terms of Incoterms 2010 are subdivided into two categories based only on method of delivery.





The larger group of seven rules applies regardless of the method of transport, while the smaller group of four being applicable only to sales that solely involve transportation over water.

Rules for Any Mode(s) of Transport

The seven rules defined by Incoterms 2010 for any mode(s) of transportation are:

1. EXW - Ex Works (named place of delivery)

The seller makes the goods available at its premises. This term places the maximum obligation on the buyer and minimum obligations on the seller. The Ex Works term is often used when making an initial quotation for the sale of goods without any costs included. EXW means that a seller has the goods ready for collection at his premises (works, factory, warehouse, plant) on the date agreed upon. The buyer pays all transportation costs and also bears the risks for bringing the goods to their final destination.

The seller does not load the goods on collecting vehicles and does not clear them for export.



If the seller does load the goods, he does so at buyer's risk and cost. If parties wish seller to be responsible for the loading of the goods on departure and to bear the risk and all costs of such loading, this must be made clear by adding explicit wording to this effect in the contract of sale.

2. FCA - Free Carrier (named place of delivery)

The seller hand over the goods, cleared for export, into the disposal of the first carrier (named by the buyer) at the named place. The seller pays for carriage to the named point of delivery, and risk passes when the goods are handed over to the first carrier.

3. CPT - Carriage Paid To (named place of destination)

The seller pays for carriage. Risk transfers to buyer upon handing goods over to the first carrier.

4. CIP - Carriage and Insurance Paid To (named place of destination)

The containerized transport / multimodal equivalent of CIF. Seller pays for carriage and insurance to the named destination point, but risk passes when the goods are handed over to the first carrier.

5. DAT - Delivered at Terminal (named terminal at port or place of destination)

Seller pays for carriage to the terminal, except for costs related to import clearance, and assumes all risks up to the point that the goods are unloaded at the terminal.

6. DAP - Delivered at Place (named place of destination)

Seller pays for carriage to the named place, except for costs related to import clearance, and assumes all risks prior to the point that the goods are ready for unloading by the buyer.

7. DDP - Delivered Duty Paid (named place of destination)

Seller is responsible for delivering the goods to the named place in the country of the buyer, and pays all costs in bringing the goods to the destination including import duties and taxes. This term places the maximum obligations on the seller and minimum obligations on the buyer.

Rules for Sea and Inland Waterway Transport

The four rules defined by Incoterms 2010 for international trade where transportation is entirely conducted by water are:

1. FAS - Free Alongside Ship (named port of shipment) The seller must place the goods alongside the ship at the named port. The seller must clear the goods for export. Suitable only for maritime transport but NET for multimodal sea transport in containers. This term is typically used for heavy-lift or bulk cargo.

2. FOB - Free on Board (named port of shipment)

The seller must load the goods on board the vessel nominated by the buyer. Cost and risk are divided when the goods are actually on board of the vessel (this rule is new). The seller must clear the goods for export.

The term is applicable for maritime and inland waterway transport only but not for multimodal sea transport in containers. The buyer must instruct the seller the details of the vessel and the port where the goods are to be loaded, and there is no reference to, or provision for, the use of a carrier or forwarder. This term has been greatly misused over the last three decades ever since Incoterms 1980 explained that FCA should be used for container shipments.

3. CFR - Cost and Freight (named port of destination)

Seller must pay the costs and freight to bring the goods to the port of destination. However, risk is transferred to the buyer once the goods are loaded on the vessel (this rule is new!).

Maritime transport only and Insurance for the goods is not included. This term is formerly known as CNF (C&F).

4. CIF - Cost, Insurance and Freight (named port of destination)

Exactly the same as CFR except that the seller must in addition procure and pay for the insurance. Maritime transport only in 1921



Incoterm	Named Place	Sharing of Costs and Risk between Buyer and Seller in International Trade.		
EXW EX works	Loading Location			
FCA Free Carrier	Loading Location			
FAS Free Alongside Ship	Port of Loading			
FOB Free On Board	Port of Loading			
CFR Cost And Freight	Port of Destination			
CIF Cost Insurance And Freight	Port of Destination			
CIP Carriage And Insurance Paid To	Delivery Location			
DDU Delivery Duty Unpaid	Delivery Location			
DDP Delivery Duty Paid	Delivery Location			

Seller's Cost/Risk Buyer's Cost/Risk

Figure 4.8: Seller and Buyer Relations Under Incoterms

Review Questions

I. Question & Answer:

1. Write down the role of International Chamber of Commerce in doing business Internationally.
2. What is Incoterms?

II. Match the following:

- | | |
|---------------------------------------|--|
| 1. Incoterms | : in 1921 |
| 2. Inco terms rules began development | : Three letter word to communicate the tasks, costs and risks associated with the transportation and delivery of goods |
| 3. Group of seven rules of Incoterms | : Ex works (named place of delivery) |
| 4. Ex works | : Applicable only to sales |
| 5. Group of four rules of Incoterms | : Applies to the method of transport |

III. Write one word against each statement using Incoterms:

1. The seller makes the goods available at its premises.
2. The seller pays for the carriage to the named point of delivery.
3. Seller is responsible for delivering the goods to the named place in the country of the buyer.
4. The seller must place the goods along side the ship at the named port.
5. The seller must load the goods on board the vessel nominated by the buyer.

IV. Activity:

1. Prepare a list of documents mentioned under Incoterms used for International trade and discuss its utilities in the class room.

4.3 Sea Borne Trade and Ports in India

Brief History of Water Transportation

From its modest origins as Egyptian coastal sail ships around 3,200 BC, water transportation has always been the dominant support of global trade. By 1,200 BC Egyptian ships traded as far as Sumatra, representing one of the longest maritime routes of that time.

European colonial powers, mainly Spain, Portugal, England, the Netherland and France are the first to establish a true global maritime trade network. With the development of the steam engine in the mid 19th century, this role expanded considerably as ships were no longer subject to dominant wind patterns.

This long term attribute has been reinforced by recent trends where changes in international trade and seaborne trade are interrelated.

Maritime transportation like all transportation is a derived demand.

Currently, seaborne trade accounted for 89.6% of global trade in terms of volume and 70.1% in terms of value.

Maritime shipping is one of the most globalized industries in terms of ownership and operations. Without shipping the import and export of goods on the scale necessary for the modern world would not be possible. Seaborne trade continues to expand, bringing benefits for consumers across the world through competitive freight costs. Thanks to the growing efficiency of shipping as a mode of transport and increased economic liberalisation, the prospects for the industry's further growth continue to be strong.

Shipping trade estimates are often calculated in tonne-miles, as a way of measuring the volume of trade (or "transportation work", as it is sometimes referred). In 2008, for example, it is estimated that the industry transported over 7.7 thousand million tonnes of cargo,





equivalent to a total volume of world trade by sea of over 32 thousand billion tonne-miles. Advances in technology have also made shipping an increasingly efficient and swift method of transportation. Over the last four decades total seaborne trade estimates have quadrupled, from just over 8 thousand billion tonne-miles in 1968 to over 32 thousand billion tonne-miles in 2008.

Throughout the last century the shipping industry has seen a general trend of increases in total trade volume. Increasing industrialisation and the liberalisation of national economies have fuelled free trade and a growing demand for consumer products.

In 2009, since the recession took hold in the second half of 2008, energy demand has tapered off, starting in late 2008 and continuing during 2009. Consequently, world shipments of tanker trade volumes, including crude oil, petroleum products and liquefied natural gas (LNG) fell by 3.0 per cent in 2009.

Total tanker cargoes loaded amounted to 2.65 billion tons, down from 2.73 billion tons loaded in 2008. In 2009, dry cargo volumes, including dry bulks, container cargo and other dry cargoes, recorded their first drop since 1983 (by 5.2 per cent) and stood at about 5.2 billion tons.



The year 2009 proved to be the most challenging and dramatic year in the history of container shipping. After having grown at an impressive average annual rate of around 10.0 percent over the last two decades, by far surpassing the growth in other seaborne trade segments container trade recorded its first absolute contraction ever, since containerization began. In 2009, container trade volumes fell sharply, by 9.0 per cent, with the overall volume totaling 124 million twenty-foot equivalent units (TEUs). The year 2009 proved to be the most challenging and dramatic year in the history of container shipping.

After having grown at an impressive average annual rate of around 10.0 percent over the last two decades, by far surpassing the growth in other seaborne trade segments container trade recorded its first absolute contraction ever, since containerization began. In 2009, container trade volumes fell sharply, by 9.0 percent, with the overall volume totaling 124 million twenty-foot equivalent units (TEUs). Global GDP and international seaborne trade are expected to recover and grow in 2011-12, with developing economies, and China in particular, charting the course.

An important factor influencing the outlook is the demand and supply imbalance and its implications for shipping companies, freight markets and shipyards. Significant fleet expansion, prompted by the promise of an extended boom period, is a major concern. The shipping industry is facing large scale orders for ships.



Figure 4.9: Containers on Ship



Figure 4.10: Ship Sailing with Containers

4.3.1 World Fleet

At the beginning of 2010, the world merchant fleet reached 1,276 million deadweight tons (dwt), an increase of 84 million dwt (7 per cent) over 2009. This growth resulted from record new deliveries of 117 million dwt, as against demolitions and other withdrawals from the market of approximately 33 million dwt.

In spite of the economic crisis, new deliveries in 2009 grew by 42 percent over 2008 as a result of ships having been ordered prior to the down turn in demand. The resulting oversupply of tonnage then led to a surge in demolitions of older tonnage by more than 300 percent. In 2009, China overtook Germany as the third largest ship owning country, surpassed Japan as the second biggest shipbuilding country, and replaced India as the busiest ship recycling country.

China has also emerged as an important provider of ship finance, supporting owners and shipyards in avoiding the cancellation of ship orders. In January 2010, there were 102,194 commercial ships in service, with a combined tonnage of 1,276,137 thousand dwt.

Oil tankers accounted for 450 million dwt (35.3 percent) and dry bulk carriers for 457 million dwt (35.8 %), representing annual increases of 7.6 and 9.1 percent respectively. Container ships reached 169 million dwt - an increase of 4.5 percent over 2009 - while the fleet of general cargo ships declined during 2009, reaching 108 million dwt in January 2010, corresponding to just 8.5 percent of the fleet.

Among other vessel types, the tonnage of liquefied gas carriers continued to grow, reaching 41 million dwt.

This was an increase of almost 12 percent over 2008, in which deliveries had already reached a historic high.





Figure 4.11: Fleet at Destination Port

4.3.2 Ownership of World Fleet

At the beginning of 2010, owners from Greece controlled 15.96 percent of the world's tonnage, followed by owners from Japan with 15.73 per cent and then owners from China with 8.96 per cent.

All three countries have seen their market share increase since 2009, and China has actually overtaken Germany as the third largest ship owning country.

In terms of vessel numbers, Japan continues to be the leading country, with 3,751 ships of 1,000 GT and above, followed by China with 3,633 ships.

In terms of nationally flagged and beneficially owned tonnage, the Greek fleet is the world's largest, accounting for 58.5 million dwt, followed by the Chinese-owned and flagged fleet with 41 million dwt.

Together, the top 35 ship owning countries (in terms of dwt) control 95.5 percent of the world tonnage.

About one third of this tonnage is controlled by owners from developing countries and about two thirds by owners from developed countries.

Of the top 35 countries and territories, 18 are classified as developed, 16 as developing, and 1 as an economy in transition.

Sixteen of the countries or territories are in Asia, 15 are in Europe, and 4 are in Americas, while none are in Africa or Oceania.

As regards flags of registration, 68.4 percent of the world's tonnage is foreign flagged.

The percentage is higher for developed countries (approximately 75 percent foreign flagged) than for developing countries (about 57 percent foreign flagged).



Figure 4.12: International Trade through Box

4.3.3 Major Shipping Routes



Figure 4.13: Sea Routes in Map



Figure 4.14: World Sea Routes

Most world shipping is confined to rather well defined routes.

Development of shipping in a region depends on population density, economic advancement and many other interrelated conditions like port and refuelling facilities.

1. The North Atlantic Route lies between Western Europe and Eastern Canada and the United States.
2. The Mediterranean- Red Sea-Indian Ocean Route-Connects North Western Europe with the Mediterranean, Eastern Europe, Southern and Eastern Asia, Australia, New Zealand.
3. The Cape Route -Western Europe, Africa and Australia.
4. The South Atlantic Route-lies between rich agricultural regions of South Eastern South America, North Western Europe and the Mediterranean.
5. The Panama Route-Eastern North America and Western US, Western Canada and Chiles.



Figure 4.15: World Major Sea Port

Review Question

I. Write True or False against each statements:

1. Maritime shipping are of the most globalized industries in terms of ownership and operations.
2. Shipping trade estimates are calculated in kg / miles.
3. Asian colonial powers like Japan, China are the first to establish a true global maritime trade network.
4. DWT is known as dead weight tons.
5. In 2010, Grece controlled 15.96% of the world's tonnage.



4.3.4 Insurance

Insurance has played a vital role in development of modern commerce. It is inevitable in keeping alive the large scale production and widespread market. From the legal point of view it is a contract of two parties. One party charge a specific sum of from the other and promise it to pay for the damages upto a specified limit.



Figure 4.16: Ship at Risk

4.3.5 Importance of Insurance

- ▶ It gives protection to businessman and industrialist against economic loss resulting from accidents and uncertain risks.
- ▶ It frees businessman from worries of business risks and generates a feeling of safety.
- ▶ Insurance company gives loan to policy holder.
- ▶ Premium collected by insurance companies help in development of business and industries.

Review Questions

I. Fill in the blanks:

1. The world merchant fleet reached dead weight tons (DWT).
2. The year proved to be the most challenging and dramatic year in the history of container shipping.
3. TEUs is known as
4. has overtaken Germany as the third largest ship owning country.
5. The fleet is the world's largest accounting for 58-5 million DWT.

II. Match the following shipping routes:

- | | |
|-------------------|--|
| 1. The Cape Route | : Eastern North America and Western US,
Western Canada and Chiles |
|-------------------|--|

2. The Panama Route : Western Europe and Eastern Canada and the U.S.
3. The North Atlantic Route : Western Europe, Africa and Australia



Figure 4.17: Major and Intermediate Ports in India

4.4 Summary

This unit discusses role of technology in logistics operations. It has widely discussed the technology is improving operational effectiveness and efficiency to improve accuracy and speed in material and information flow in the supply chain to increase manifold productivity, effectiveness in logistics operations. The unit covers the latest technologies and its utility. GPRS, Barcoding, RFID & RFT are some of them.

It has also covered an important area of domestic and international cargo documents in detail. Each document is having importance in movements of goods, its significance is elaborated, Legal issues of international documentation with wide reasons and its development are also discussed. Institutions like International Chamber of Commerce and its time to time directives given for new terms like Incoterms are widely focused. Sea borne trade and ports in India covers the brief account of water transportation, world fleet. Logistics and supply chain uses in world Industry gives a glimpse of this industry especially in post globalization era.

4.5 Exercise

1. Write down the importance of information technology in logistics.
2. Discuss the latest technologies used in logistics industry.
3. Write a brief note on Barcode. Explain the commercial use of barcode.
4. Why radio frequency identification is now in more use? Give reasons.
5. Write down the important domestic cargo documents.
6. What are the reasons for issue of domestic documents?
7. Discuss the types of consignment note and also tell its importance.
8. Write the advantage of lorry hire contract.
9. Why do one take route permit in transport?
10. What is truck registration?
11. Why do we do bulky documentation in international trade?
12. What are the three categories of documents?
13. Explain commercial documents, its purpose with reason.
14. What is bill of lading?
15. Explain bill of exchange.
16. Write down the types of bill of exchange.
17. What are the documents used under Indian customs act?
18. Discuss development of international chamber of commerce.



19. Why ICC is needed in international trade?
20. What is Incoterms? Discuss its evolution.
21. Write short note in following Incoterms.
 - a. EXW
 - b. FCA
 - c. CIP
 - d. DAP
 - e. DDP
 - f. FAS
 - g. FOB
 - h. CIF
22. Explain the history of water transportation in the world.
23. Discuss the brief account of world fleet in recent time.
24. Discuss five major shipping routes followed in marine transport of world.

4.6 Practical

1. On the basis of Utility of following technology in different industries.
 - a. GPRS
 - b. Barcode
 - c. RFT
 - d. EDI

Discuss it in the classroom
2. Visit a transport company in your city / town to collect the transport documents and discuss its uses in the classroom.
3. Prepare a case on export documentations and discuss the classification of following:
 - a. Commercial
 - b. Statutory
 - c. Documents for claiming export benefits



UNIT 5

Emerging Issues in SCM & Logistics

- 5.0 Unit Overview & Description
- 5.1 Statutory Provisions Dealing Transport
- 5.2 Object of Multimodal Transportation Act 1993
- 5.3 Appeal
- 5.4 Contents of Multimodal Transport Document
- 5.5 Motor Vehicles Act 1988 - Driving Rules
- 5.6 Insurance
- 5.7 Summary

5.0 Unit Overview & Description

The unit covers the statutory provisions of multimodal transportation Act 1993 which became necessity after development of transport technology. The unit also assist in understanding the brief outlines of the Act.

Introducing Motor Vehicle Act 1988 is also the purpose of this unit which covers the basic rules of the road and the documents to be carried. For any transport documents insurance of cargo is an important part to cover the various risks. This unit provide information related to marine insurance, its types and the how the value is evaluated covered.

Knowledge and Skill Outcomes

The unit is expected to import the following knowledge and skill.

- ▶ Understanding the statutory permission of Multi-modal Transport Act. 1993.
- ▶ Expose to the object of Multinational Transport Act 1993 and its need.
- ▶ Develops awareness relating to Motor Vehicles Act 1988.
- ▶ Provides exposures to driving rules under Motor Vehicle Act 1988.
- ▶ Give a brief outline of Insurance and Marine insurance.

Resource Material

1. Nabhi's Board of Editors: Exporters Manual and Documentation 2009, Nabhi Publications, New Delhi.
2. Nabhi's Board of Editors: How to Export 2012, 19th Edition August 2012, Nabhi Publications, New Delhi.
3. Muthiah Krishnaveni, Logistics Management and World Sea Borne Trade, 2nd Edition; Himalaya Publishing Books, New Delhi (2001).
4. Reji Ismail, Logistic Management, Excel Books, New Delhi (2008).

Learning Outcomes

Unit V	Emerging Issues in SCM & Logistics	Outcomes
5.1	Statutory provisions dealing transport.	Explain important provisions of Multi-modal Transportation Act 1993.
5.2	Object of Multi-modal Transportation Act 1993.	Write down the object of Multi-modal Transportation Act 1993.
5.3	Appeal.	Understand appeal.
5.4	Contents of Multi-modal Transport Document.	List contents of Multi-modal Transport Document.
5.5	Motor Vehicles Act 1988 - Driving Rules.	List the basic rules of the road.
5.6	Insurance.	Write down the rule of insurance. Explain marine insurance and discuss the types of risks covered under it. Write down the claim procedure of marine insurance.

Assessment Plan

Unit V	Topic	Assessment Method	Time Plan	Remarks
5.1	Statutory provisions dealing transport.	Exercise: Question & Answer		
5.2, 5.3, and 5.4	Object of Multi-modal Transportation Act 1993, Appeal, Contents of Multi-modal Transport Document.	Exercise: Activity, T & F, Question and Answers		
5.5	Motor Vehicles Act 1988 - Driving Rules.	Exercise: Question and Answer, Match the following		
5.6	Insurance.	Exercise: Question and Answer, Match the following, T & F, Activity		

5.1 Statutory Provisions Dealing Transport

Multimodal Transportation Act 1993

Various Structural changes took place in the international transportation of goods due to advances in the transport technology including containers.

Containers are increasingly being used for transportation of goods from one country to another country, using more than one mode of transportation and carrier. Multimodal transportation of goods has become standard practice in the international trade.



Figure 5.1: Multimodal Transport Carrying Container Boxes

Overseas general cargo of India also started moving in containers. In order to facilitate containerized trade, container handling facilities in major Indian Ports, container railway flat wagons, inland container depots and container freight stations have been developed and are being developed.

On the recommendation of working group an act was passed in 1993 called Multimodal Transportation Act.

Concept of International Multimodal Transport covers door to door movement of goods under the responsibility of a single transport operator.

The emergence of container technology and of the multimodal transport concept came from and facilitated growing international trade.

Trade and transport are inextricably linked: Efficient transport services are a prerequisite to successful trading.

International transport generally implies the use of various transport links (interfaces and modes), each link corresponding to a transfer, storage or transport operation either in the country of origin, in a transit country, or in the country of final destination.

Review Question

1. What do you mean by multimodal transportation Act-1993?

5.2 Object of Multimodal Transportation Act 1993



Figure 5.2: Multimodal Transportation

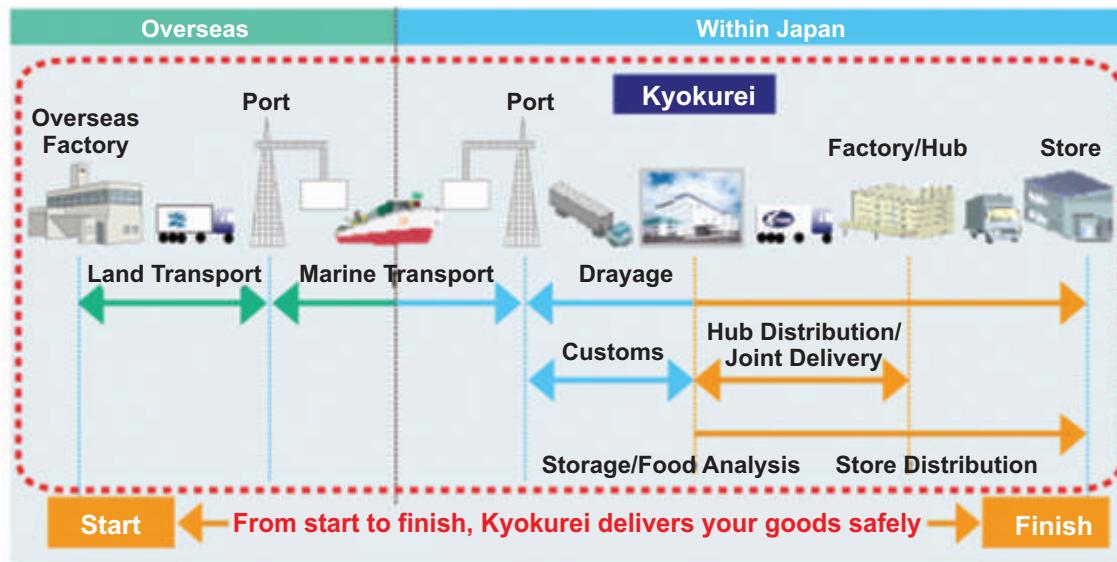


Figure 5.3: Multimodal Transportation Example

The Objects and Reasons of the Multimodal Transportation of Goods Act, 1993 states that “*in the context of various measures taken by the Government of India to liberalize controls, simplify procedure, facilitate smooth flow of international trade and promotion of exports, it became necessary to immediately regulate multimodal transportation of goods by law with a view to reducing and eliminating interruption in the continuous movements of goods from their origin to the ultimate destination as also reducing cost and delays and improving the quality of transport services*”.

Carriage of goods from door to door is not a new concept and has been in practice under the segmented transportation system for years.

Multimodal transportation of goods under one multimodal document or contract is just another service being provided by these providers.

Regulation of Multimodal Transport

No person to carry on business without registration.

- ▶ Provided that a person carrying on the business of multimodal transportation immediately before the commencement of this Act, may continue to do so for a period of three months from such commencement and if he has made an application for registration within the said period till the disposal of such application.
 - (1) Any person may apply for registration to the competent authority to carry on or commence the business of multimodal transportation.
 - (2) An application under sub-section (1) shall be made in such form as may be prescribed and shall be accompanied by a fee often thousand rupees.
 - (3) On receipt of the application, the competent authority shall satisfy that the applicant fulfils the following conditions namely:
 - (a) (i) That the applicant is a shipping company or a company engaged in the business of freight forwarding in India or abroad with a minimum annual turnover of fifty lakh rupees during the immediate preceding financial year or an average annual turnover of fifty lakh rupees during the preceding three financial years as certified by a chartered accountant within the meaning of the Chartered Accountants Act, 1949;
 - (ii) That if the applicant is of a company other than a company specified in subclause (i), the subscribed share capital of such company is not less than fifty lakh rupees;
 - (b) That the applicant has offices or agents or representatives in not less than two other countries, and on being so satisfied, register the applicant as a multimodal transport operator and grant a certificate to it to carry on or commence the business of multimodal transportation.
 - (4) A certificate granted under sub-section (3) shall be valid for a period of one year and may be renewed from time to time for a further period of one year at a time.
 - (5) An application for renewal shall be made in such form as may be prescribed and shall be accompanied by a fee of two thousand rupees.

5.3 Appeal

1. Any person aggrieved by an order made by the competent authority under section 5 may prefer an appeal to the Central Government within such period as may be prescribed.
2. No appeal shall be admitted if it is preferred after the expiry of the prescribed period.

3. Every appeal made under this section shall be made in such form and on payment of such fees as may be prescribed and shall be accompanied by a copy of the order appealed against.

5.4 Contents of Multimodal Transport Document

The multimodal transport document shall contain the following particulars namely:

- (a) The general nature of the goods, the leading marks necessary for identification of the goods, the character of the goods (including dangerous goods), number of packages or units and the gross weight and quantity of the goods.
- (b) Apparent condition of the goods.
- (c) The name and principal place of business of the multimodal transport operator.
- (d) The name of the consignor.
- (e) The name of the consignee, if specified by the consignor.
- (f) The place and date of taking charge of the goods by the multimodal transport operator.
- (g) The place of delivery of the goods.
- (h) The date or the period of delivery of the goods at the place of delivery.
- (i) Whether it is negotiable or non-negotiable.
- (j) The place and date of its issue.
- (k) Freight payable by the consignor or the consignee, as the case may be.
- (l) The signature of the multimodal transport operator or of a person duly authorized by him.
- (m) The intended journey route, modes of transport and places of transhipment, if known at the time of its issue.



Review Questions

I. Write True or False against each statement:

1. Multi-model transportation has become standard practice in the international trade.
2. Multimodal Transportation Act passed in 1995.
3. In international transportation of goods advances in transport technology has taken place.
4. In Multimodal transport door to door movement of goods is the responsibility of a single transport operator.

II. Question & Answer:

1. Write down the important objective of Multimodel Transportation Act 1993.
2. Discuss important steps of Multimodel Transportation Act 1993.

III. Activity:

Take a case of Indian post office and find out how it uses multimodel transport to send the goods.

5.5 Motor Vehicles Act 1988-Driving Rules

The first enactment relating to motor vehicles in India was the Indian Motor Vehicles Act, 1914, which was subsequently replaced by the Motor Vehicles Act, 1939. The Act of 1939 had been amended several times. In spite of several amendments it was felt necessary to bring out a comprehensive legislation keeping in view the changes in the transport technology, pattern of passenger and freight movements, development of the road network in the country and particularly the improved techniques in the motor vehicles management. A Working Group was, therefore, constituted in January, 1984 to review all the provisions of the Act of 1939. The Working Group taking into account the suggestions and recommendations made earlier by various bodies and institutions had made certain recommendations. A motor vehicles bill was introduced in the Parliament and passed in 1988 now known as Motor Vehicles Act 1988.



Figure 5.4: Traffic Police In Different Action

5.5.1 Basic Rules of the Road

With new vehicles coming out each day and lot of new drivers behind the wheel, it is imperative that we get back to the basics and make sure we are following the rules and making sure everyone else we know is following the rules. No exceptions - if you are behind the wheel of a car or riding a two wheeler you have to know and follow the rules. According to Road Safety and Highways department following rules to be observed. These rules are referred to as the Rules of the Road Regulations, 1989 and came into effect from the first day of July 1989. Here they are:

- Keep Left:** Drive as close to the left side of the road and allow all traffic going in the opposite direction to pass on the right hand side.
- Turning Left:** When needing to turn onto a road on the left, stay close to the left side of the road and after making the turn continue on the left side of the road. (Do not cut across lanes from the right side of the road and then turn left).
- Turning Right:** When turning onto a road on the right side, first approach the center of the road as safely as possible and then turn to the right and stay on the left side of the road.
- Passing:** If there is a need to pass traffic proceeding in the same direction, always pass/overtake them on their right side. The only exception to this would be the case where a vehicle that is trying to turn to the right (and has indicated their intention to turn right) is occupying the center lane and therefore requires passing them on the left side.
- Passing Prohibited:** Overtaking / passing a vehicle proceeding in the same direction is prohibited in the following scenarios:
 - The passing / overtaking would cause inconvenience or danger to any vehicle proceeding in any direction.
 - On bends / curves in the road or on hills or there are other obstructions present that prevents a clear view of the road ahead.
 - If the driver behind the current vehicle has already started to overtake the vehicle.
 - The driver of the vehicle in front has not yet signaled that he may be overtaken.

The solid lines painted on the middle of the road indicate passing is prohibited for as long as the line is a solid line- you will notice them on bridges, curves and where visibility of the road ahead is not present. Overtaking when safe to do so is allowed when the line changes to a dashed line.)
- When Being Passed / Overtaken By Another Vehicle:** The driver should not speed up or do anything to prevent the other vehicle from passing.
- Intersections:** Drivers should slow down when approaching road corners, intersections, junctions or pedestrian crossings and not enter until sure that such an entry will not endanger the safety of pedestrians or people in other vehicles there.
- Right of Way:** When entering an intersection that is not regulated by a traffic signal or by a traffic policeman and which is an entry onto a main road, the driver of the vehicle is to give right of way to the vehicles already proceeding on that road. In all other cases the driver is to give way to traffic approaching from his right hand side and only then proceed.
- Emergency Vehicles:** Fire Service Vehicles and Ambulances are to be allowed free passage and drivers of all other vehicles should move their vehicles to the side of the road to do so.



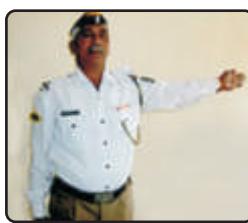
- 
- 10. Pedestrians:** Pedestrians have the right of way at uncontrolled pedestrian crossings.
 - 11. "U" Turns:** "U" turns may be done only when:
 1. Not explicitly prohibited by a sign.
 2. Only after indicating the turn is being planned either through a hand signal or through the vehicle indicators.
 3. After checking the mirrors to make sure there is no traffic from behind.
 4. Checking the road to make sure that there is no other traffic and it is safe to do so.
 - 12. Required Signals:** These are really hand signals that are mentioned in point 13 of the rules of the road. Very few people actually know the hand signs and use them. It is good to learn them and be prepared to use them if you have any issue with your indicator lights or with your brake lights. The hand signs for the following should be followed if the vehicle brake / indicator lights do not work:
 1. When the vehicle is about to slow down.
 2. When the vehicle is about to stop.
 3. When the vehicle is about to turn to the right side or pass a vehicle on the right.
 4. When the vehicle is about to turn to the left.
 5. When indicating that it is safe for the vehicle behind to pass.
 - 13. Indicators:** The signals indicated in regulation #13 can be simplified by the use of mechanical or electrical devices (indicators).
 - 14. Parking:** When parking the vehicle make sure that it does not cause any danger, obstruction or inconvenience for other road users.
 - 15. Registration:** Loads or goods should not be kept on the vehicle in a manner that obstructs visibility, the headlamps / tail lamps or the registration number of the vehicle. If any obstruction of the registration is done a duplicate is to be kept in a visible spot.
 - 16. One Way Roads:** On designated "One Way" roads drive only in the direction indicated on the road signs. Do not drive the vehicle in reverse into a "One way" street.
 - 17. Stop Lines:** At road intersections, pedestrian crossings and stop signs make sure that the vehicle is fully behind the stop lines painted on the road. The driver has to drive taking into account this requirement of stopping before the stop line when required by a stop light or sign or by a police officer.
 - 18. Towing:** No vehicles may be towed behind another motor vehicle. The only exceptions are:
 1. Mechanically disabled vehicles.
 2. Incompletely assembled vehicles.

3. Registered trailers and sidecars.
 4. The above may be towed only for the purpose of delivery or to the nearest garage or service station.
19. **Noise:** Drivers should not:
1. Sound the horn more than necessary for safety. Continuously and unnecessary sounding of the horn is illegal.
 2. Sound the horn in designated silent zones (for e.g. such as hospital zones).
 3. Use multi-toned horns that are harsh, shrill, loud or alarming.
 4. Use cut outs for the exhausts.
 5. Drive vehicles that create a lot of noise when in motion.
 6. Drive vehicles without proper mufflers causing a loud sound.
20. **Traffic Lights & Signs:** Obey the traffic signal lights, the instructions given by the traffic policemen or by designated / authorized people in charge of regulating traffic.
21. **Following Distance:** Keep sufficient distance behind the vehicle in front to allow distance to stop if the vehicle in front has to stop suddenly.
22. **Right of Way on Mountain Roads / Steep Roads:** Where the width of the road is not sufficient for vehicles to pass each other safely, the vehicle going downhill has to stop to the side of the road and allow the vehicles going uphill to pass.
23. **Obstruction of Control:** The driver of the vehicle should not allow a person to sit, stand or place anything that obstructs his control of the vehicle.
24. **Passing Pedestrians:** When passing a procession, meeting, troops or police on the march or road repair workmen do not drive faster than 25 kilometers per hour.
25. **Tractor & Goods Carriages:** Drivers of tractors are not permitted to carry passengers on the tractor. Drivers of good carriages should not allow more persons than listed on the vehicle registration to travel in the cabin or take passengers for hire or reward.
26. **Loading:** Vehicles should not be loaded in such a way that causes danger to other road users. Load carrying vehicles should not have anything extending outside the vehicle towards the front, rear, sides and should also follow allowed maximum height restrictions.
27. **Dangerous Materials:** Other than the fuel and lubricant necessary for vehicle operation, no explosive, inflammable or other dangerous substance should be carried on any public transport vehicle.
28. **Driving in Reverse:** The driver should not drive the vehicle in reverse without first making sure that doing so would not cause any danger or inconvenience to any person on the road.



- 29. Documents to be Carried / Produced on Demand:** The person driving the vehicle is to always carry the following documents:
1. Driving License
 2. Certificate of registration of the vehicle
 3. Certificate of taxation
 4. Certificate of insurance
 5. For transport vehicles the following additional documents are required:
 1. The permit
 2. Fitness certificate
 6. These documents are to be produced on demand by any Police officer in Uniform, Officers of the Motor Vehicles Department in Uniform or by any officer authorized by the Government. If the driver does not have the documents in his/her possession he should produce attested copies in person or through registered post to the officer who demanded it within 15 days.

Traffic Police Signals



To stop vehicles coming from behind



To stop vehicles coming from front



To stop vehicles approaching simultaneously from front and behind



To stop vehicles approaching from left and wanting to turn right



To stop vehicles approaching from right to allow vehicles from the left to turn right



To stop vehicles coming from the right and turning by stopping traffic approaching from the left



Warning signal closing all vehicle



Beckoning vehicles approaching from left



Beckoning vehicles approaching from right



Beckoning vehicles from front

Figure 5.5: Different Signs by Traffic police

Review Questions

I. Question & Answer:

1. Write down the contents of Multimodal Transport documents.
2. Discuss the evolution of Motor Vehicles Act 1988.

II. Match the following statements containing traffic rules of the road:

- | | |
|---|------------------------|
| 1. Drive as close to the left side of the road and allow all traffic going. | a. Turning right |
| 2. When turning into a road on the right side, first approach the center of road as safely as possible. | b. Keep left |
| 3. Fire service vehicles and ambulances are to be allowed free passage. | c. Noise |
| 4. Drivers should not sound the horn more than necessary for safety. | d. Emergency vehicle |
| 5. Other than the fuel and lubricant necessary for vehicle operation, no explosive should be carried on any public transport vehicle. | e. Dangerous materials |

5.6 Insurance

Cargo insurance has a close relationship with the physical distribution function. Cargo insurance covers the (physical) risk associated with the physical transportation of goods to the foreign buyers.

When the goods have left the exporter's plant or warehouse and are in the course of transportation, the exporter has no physical means for the protection of these goods and must rely upon the ability of the transport company.

When the goods have left the exporter's plant or warehouse and are in the course of transportation, the exporter has no physical means for the protection of these goods and must rely upon the ability of the transport company to which he entrusts them for safe delivery at their intended destination.



Besides the fact that there are several perils and hazards beyond the control of the carrier which the goods may encounter, the carrier in export trade is not an insurer of the merchandise .He is exempted by law from certain causes of losses as well as from the conditions and stipulations.

Review Questions

I. Write True or False against each statement:

1. Passing / Overloading a vehicle proceeding in the same direction is prohibited.
2. Drivers should up the pace approaching road corners, intersections, junctions etc.
3. No vehicles may towed behind another motor vehicle.
4. Do not obey the traffic signal lights, the instructions given by the traffic policeman.
5. Vehicles should not be loaded in such a way that causes danger to other road users.

II. Question & Answer:

1. Write down five important driving rules to be followed on road.

III. Activity:

1. Consult traffic police of your town / city and note down signals used on the road to discuss in the classroom.



Figure 5.6: Insurance Companies



Figure 5.7: Marine Insurance for Cargoes

5.6.1 Marine Insurance

Marine insurance is a contract of indemnity whereby assurer or underwriter agrees goods against, known as the premium, to protect and indemnify the shipper and / or owner of the goods, or expense goods against loss, damage, or expense in connection with the goods at risks, if the damage is caused by perils specified in the contract known as the policy of insurance.

Irrespective of the terms of export sales contract, mode of transportation, etc. all export consignments should be insured.

The contract will indicate which party has to bear the cost of insuring the goods.

5.6.2 Types of Risks Covered

There are five sets of ILU cargo clauses formulated by the Institute of London Underwriters.

1. Institute Cargo Clause (c)
2. Institute of Cargo Clause (b)
3. Institute of Cargo Clause (a)
4. Institute of Cargo Clause (Cargo)
5. Institute of Cargo Clause (Cargo)

1. Institute Cargo Clause (c)

Covers loss of or damage to the goods insured:

- a. Fire or explosion.
- b. Stranding, grounding, sinking or capsizing of the vessel.
- c. Overturning order ailment of land conveyance.
- d. Collision or contact of vessel, craft or conveyance with any external object other than water.
- e. Discharge of cargo at a port of distress.
- f. General average sacrifice.
- g. Jettison.

2. Institute Cargo Clause (b)

This cover is granted by attaching Institute Cargo Clause (b) to the policy of insurance. In addition to the risks covered under Institute Cargo Clause (c) i.e. item(1) above, the following risks are covered:

1. Loss of or damage to the goods attributable to earthquake, volcanic eruption or lightning.
2. Washing overboard.
3. Washing overboard.
4. Loss of or damage to the goods caused by entry of sea, lake or river water into vessel, craft, hold, conveyance, container liftvan or place of storage.
5. Total loss of any package lost overboard or dropped whilst loading on to, or unloading from, vessel or craft.
6. Extraneous Perils: As the goods in transit are subject to a large number of non maritime extraneous perils, it is possible to extend the policy issued on Institute



Cargo Clause (b) to cover any or all the following extraneous perils by payment of suitable extra premium.

- a) Theft, pilferage and non-delivery.
- b) Fresh and / or rain water damage.
- c) Hook, oil, mud, acid and damage by other cargo.
- d) Heating and sweating.
- e) Breakage, denting, chipping, scratching and blending.
- f) Leakage.
- g) Bursting and Tearing.

3. Institute Cargo Clause (a)

This cover is granted by attaching Institute Cargo Clause (a) to the policy of insurance. This policy covers all risks of loss of or damage to the goods insured and it is the widest cover. This policy also will not cover the risks excluded under item (1) i.e, Institute Cargo Clause (c).

4 & 5 War & Strike Clause

The shipper / exporter can obtain war, riots, strike and civil commotion cover along with all the three types of policies mentioned above by payment of an additional premium. The above cover is granted by attaching Institute War Clause(Cargo) and Institute Strike Clause (Cargo) to the policy of insurance.



Figure 5.8: Scenes of Ship Sinking with Containers

Review Questions

I. Question & Answer:

1. What do you mean by marine insurance?
2. Discuss the types of risks covered under marine insurance?

II. Write the True or False against each statements:

1. There are five sets of ILU cargo claims formulated by the Institute of London Underwriters.
2. Institute cargo clause (c) covers loss of or damage to the goods insured for fire or explosion.
3. Institute cargo clause (b) does not cover risks related to loss of or damage to the goods attributable to earth quake, volcanic eruption.
4. War, riots, strike and civil commotion is covered under Institute cargo clauses (a).
5. All export consignment should be insured.

III. Activity:

1. Contact a general insurance company in your city / town and note the different policies used for vehicles by them to discuss in the classroom.

IV. Match the following statements:

- | | | |
|-------------------------------|---|---|
| 1. Institute cargo clause (c) | : | A contrast of indemnity |
| 2. Institute cargo clause (b) | : | Institute of London Underwriters |
| 3. War & strike clause | : | Covers loss of or damage from fire |
| 4. Marine Insurance | : | Cover risks of theft, pilferage |
| 5. ILU | : | Exporter can obtain war, riots & strike cover |



5.6.3 What Value Can be Insured?

Marine Insurance Policy is a contract of indemnity but it is not one of pure indemnity. Insurers cannot replace the goods, they agree to pay for such loss to the extent and manner mentioned in the policy.

Exporter should take into account the cost of goods, expenses incidental to shipping, insurance charges and his profit. Normally goods are insured for the CIF value plus ten percent. It is usual to cover 110 % of the actual CIF price of the goods. There can be two reasons for this

When the shipment is not covered by a letter of credit, it may so happen that the buyer, instead of himself collecting the insurance payment for damaged or missing goods, may send the certificate or the policy back to the exporter, asking him(exporter) to replace the



damaged or missing goods and reimburse himself by collecting the insurance money. Such a procedure will mean a higher transit cost to the exporter, and this is covered by the extra ten percent.

When the buyer retires the documents (or makes payments), he has probably also paid for the customs clearance and for the unloading and transit of the goods to his warehouse. Accordingly, he may ask the exporter to insure the goods for a value higher than the CIF value.

There may be a few instances where these charges could be exceptionally heavy and in consequences, the exporter is asked to cover the goods upto much higher (even 150) percent of their CIF value. The insurance premium is higher for such a heavier than normal cover.

5.6.4 Cost of Marine Insurance Premium

Cost of marine insurance premium is quite low, and reliable exporters, doing a fair amount of business, can probably get all the risks covered by paying 0.5% and 1% of the value insured depending on the type of goods that are insured and the types of containers in which they are shipped.



There may be an extra premium on war risks cover, which varies considerably according to the country of destination and in the light of the political conditions prevailing in the country of destination or in countries en route at the time of shipment.

Review Question

- I. Discuss the utility of cargo insurance.

5.6.5 Marine Insurance Claims Procedure

1. In the event of loss or damage to the goods, insured and / or their agents giving the details of loss.
2. It is a condition of the policy of insurance that insured and / or their agents should act as if uninsured and take such measure as maybe reasonable for the purpose of averting or minimising the loss or damage to the goods. Insured or his agent must also insure that all rights against carriers, bailees or other third parties are properly preserved.
3. While taking delivery of goods from the carriers and / or bailees, if the packages show any outward sign of loss or damage, insured and / or their agents must call for a detailed survey by ship surveyors on such survey by ship surveyors on such packages and also lodge a proper monetary claim on the Shipping Company for loss or damage found in the packages.
4. In case of packages which are found to be missing, insured must lodge a proper monetary claim for full value of the missing packages with the Shipping Company and also with the bailees, and obtain a proper acknowledgement from them.

5. In terms of Carriage of Goods Sea Act,1925, the time limit for filling suit against Shipping Companies is one year from the date of discharge. Following documents are required:
- Original insurance policy
 - Original invoice and packing list
 - Copy of bill of lading
 - Survey reports / shortland / non delivery / landed but missing certificate
 - Copies of correspondence exchanged with carriers or bailees
 - Claim bill.

Review Questions

I. Question and Answer:

- Discuss steps used in marine insurance claims.
- In the event of loss or damage to the goods, agents give the details of claims, which are?

II. Fill in the blanks:

- In case of package which are found to be missing, insured must lodge a proper claim.
- The time limit for filing suit against shipping companies is year from the date of discharge.
- A proper monetary claim on lodged for loss or damage.
- Documents required for under marine insurance claims are.
1. 2. 3.



5.7 Summary

Motor vehicles Act 1988 with driving rules to be followed has been widely discussed. Special attention is given on road traffic rules. Another important aspect of international trade related to cargo insurance is also dealt giving an idea of marine insurance its types, claims procedure.

5.8 Exercise

- What is multimodal transport.
- Name the reason responsible for the development of multimodal transportation.
- How many documents are needed under multimodal transportation?

- 
4. Discuss the registration process under the provision of multi-modal transportation Act, 1993.
 5. Explain in brief the appeal process of Multiple-modal transportation Act, 1993.
 6. Write down the important content of multi-modal transport document.
 7. What do mean by motor vehicles Act, 1988 with driving rules?
 8. Discuss the basic rules of the road.
 9. Write short notes based on basic rules of the road.

(a) Keep left	(b) Passing
(c) Intersections	(d) U turn
(e) Pedestrians	(f) Required signals
(g) One way road	(h) Stop lines
(i) Traffic light and signs	(j) Obstruction of Control
(k) Dangerous materials	
 10. Write down the documents which is to be carried or produce when demanded by authorities while driving any vehicle.
 11. What is cargo insurance?
 12. Write short notes on the types of risks given under International London Underwriters.

(a) Institute of cargo clause (c)	
(b) Institute of cargo clause (b)	
(c) Institute of Cargo clause -War & Strike Clause	
 13. What are the different cost items considered while insuring any value under insurance policy to an exporter?
 14. Write down the important steps of marine insurance claims procedure?
 15. Explain in brief, the important documents used for marine insurance policy?
 16. **Match the following:**

a. Multimodal transportation of goods covered under	: Without registration
b. No person to carry business	: Valid for a period of three years.
c. A certificate granted under sub-section (3) of multi modal transportation act 1993	: One document
d. Any person aggrieved by an order made by the component authority	: After the expiry of the period

- e. No appeal shall be admitted : May prefer an appeal to central government
17. **Write True or False against each statements:**
- Passing / overtaking would cause convenience to any vehicle proceeding in any direction.
 - Drivers should not sound the horn more than necessary for safety.
 - When parking the vehicle make sure that it cause danger and obstruction.
 - The person driving the vehicle always carry certificate of insurance.
 - For transport vehicles no additional documents are required.

5.9 Practical

- Visit nearby railway station in your city / town and prepare a note on how goods carriage is done through multimodal transportation.
- Contact a carrier company near by in your city / town to prepare a note on different documents used under multi-modal transportation Act, 1993.
- Contact at least 10 car drivers and ask the basic driving rules to them mentioned in this chapter to prepare a chart of their knowledge to driving rules.
- Visit a transport company in your city / town to know the kind of documents they are using for movements of cargoes and coverage of risks to discuss in the class.
- Contact any general insurance company representation to prepare a note on claims procedure for any kind of risks under insurance policy to discuss in the class.







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