

Important Factors on Perishable Foods Transportation and Food Logistic Systems and Turkish Food Logistic Sector

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Abstract

Food Logistics and refrigerated systems are very important tools for developing to international trade and transportation. Over a million refrigerated road vehicles, 400,000 refrigerated containers and many thousands of other forms of refrigerated transport systems are used to distribute chilled and frozen foods throughout the world. During the operation, equipments and conditions are necessary for protecting to these goods as refrigerating systems, air refrigerating systems and insulated equipments. Refrigerating has very important role for protecting to food quality from microbial deterioration. Very serious factor of refrigerated transportation is protection of perishable goods. Quality loss caused from late delivery and errors on temperature control. Only, food products can be deteriorating with low or high temperature. Today, refrigerated transportation technologies have advanced in comparison with the past. Few technologies can be used by logistic sector. Especially related with food logistic, different transportation modes and equipments can be favored by transport users. Consequently, favoring to transportation modes, designing to networks for food transportation and collecting information related with transportation of these products and equipments has very specific roles for performance and management during operations. This study will focus on food logistics and transportations on the light of international rules and regulations related with transportation and stocking of food products as international standards, equipments. Especially refrigerating systems will be analyzed as cryogenic refrigerating systems, mechanic refrigerating systems and ice.

Keywords; ATP Convention, Food Transportation, Refrigerating Systems, Turkey, European Union, Handling, Loading and Unloading on Food Transportation.

Introduction

Production and logistics facilities in the supply chain of perishable goods are situated between the origin and the supply market or in a part of the latter. Any changes in time-distance or temperature in the chain could increase the costs or cause the net present value of the activities and their added value in the supply

chain to be perturbed. This study has focus on conditions of preservation of perishable goods in cold logistic chains. These parameters and conditions can be change as each one goods. However, general and fixed provisions cannot be providing an effective solution for protecting to perishable goods. At the same time, for these goods any precaution can be caused costly distribution. The parameters to be estimated are the intensity of deterioration of goods at given stages of production or distribution in the supply chain and the conservation effect of perishable goods, dependent on the state of the system and activated with time delay. "Since we are interested in the values of these parameters and their stability, the primary objective of the paper is to develop a framework for econometric estimation of parameters at different stages of production and distribution in supply chains. Therefore the global logistics management of cold chains and the contributions of leading researchers from this field are being presented in the following chapter. The third chapter discusses the preservation of perishable goods in cold logistic chains, while in the fourth chapter the foundations for econometric estimation of the aforementioned parameters of preservation are being developed. This is illustrated in detail with a numerical example of a food-processing company in the penultimate chapter. The final chapter concludes our work with some key findings (1). At the same time this article will focus on international carriage of perishable foodstuffs (ATP)

1) International carriage of perishable foodstuffs (ATP Convention)

Perishable goods transportation is a specific transportation. Especially these materials can be come to harm and deteriorate while they carriage. Consequently they can cause to economic loses and environmental fatalities. At the same time these materials can be cause to raised medical costs. Therefore states need to legal arrangements related with perishable goods transportation. According to these legislations, transportation equipments has defined that insulated and refrigerated or mechanic refrigerated. Convention has determined technical specifications of these trailers and trucks.

On the other hand, contracting parties of this convention have agreed for similar test methods and standards of transportation equipments. However a contracting party will recognize to applications of other contracting parties according to ATP convention.

a) Refrigeration Techniques According to ATP Conventions

In the past, various methods of refrigerating trucks have been used. These include hold-over plate systems, ice, ice and salt, dry ice, cryogenic systems, and mechanical refrigeration. Today, however, mechanical refrigeration is the predominant type. Trailers refrigerated with cryogenic refrigerants, usually liquid carbon dioxide (CO₂) or nitrogen (N₂), have been used to some extent over the past three decades, but they are not as popular as trailers refrigerated mechanically (2).

i) Mechanical Refrigeration

Mechanical refrigeration operates by absorbing heat at one point and dispensing it at another. This is accomplished by circulating a refrigerant between two points. The refrigerant picks up heat through a coil (evaporator) inside the cargo space and discharges it through another coil (condenser) on the outside. The refrigerant is circulated through the system by a compressor, which is driven by a gasoline, diesel, or electrical motor.

ii) Cryogenic Refrigerants

Cryogenic (low-temperature) refrigerating systems, which use liquid or solid carbon dioxide (CO₂) or liquid nitrogen (N₂), are available for highway trailers. They are used primarily in delivery operations requiring one-day or less transit time, since supplies of liquid cryogenics are not available at truck stops. Benefits of the cryogenic systems are that they have fewer moving parts to maintain and replace, and also allow quick recovery of thermostat set-point temperature after delivery stops. Liquid cryogenic systems usually operate by having the liquid refrigerant in pressurized tanks. A temperature-sensing element inside the trailer activates a controller which releases the liquid refrigerant through a spray nozzle at the ceiling of the trailer. The liquid CO₂ or N₂ spray flashes into gas as it hits the warmer air in the trailer, absorbing the heat. When the desired temperature is reached, the sensing element sends a signal to the controller to shut off the flow of refrigerant. In another type system, the liquid CO₂ is circulated through a coil or plate heat exchanger and the vaporized gas vented outside. A third type of system stores CO₂ snow in a full length ceiling bunker and cools as the snow melts (3).

iii) Ice

Ice is a very important tool for absorb of heat and also enables to maintain dampness in loads of perishable produce. The main disadvantage for ice are its volume and weight, which cuts down on the payload; the difficulty and expense of implementing ice enroot; the need for watertight packaging when applied as top-ice; and the damage some perishable goods cause when contacted by ice. Slush-ice or crushed blown over the top of produce loads is used to refrigerate and maintain high levels of dampness for certain products. As noted that “top-icing.” Some loaders might apply the crushed ice or slush ice to individual pallet loads or in individual boxes of product (package-ice) before loading.

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