

Guide to Food Safety and Quality During Transportation

Controls, Standards and Practices

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Guide to Food Safety and Quality During Transportation

For Robin

Background

If you open your refrigerator and look at all the food inside, do you have any idea of the average distance that your food travelled to get to you?

In the United States, on average, food travels around 2000 or more miles to get into your refrigerator.

Would it surprise you to know that there are no established sanitation, traceability or temperature control food safety standards that perishable food carriers must comply with during the transportation process?

Food safety standards, inspection and audit programs and organizations exist for farms, packing houses, distribution centers, wholesalers, retailers, restaurants and food processors, but not for the companies that actually move the food from one place to another. Your food goes in and out of those facilities, in and out of trucks and on and off ships and airplanes, but there is no set of standards established for in-transit carriers of perishable foods.

This lack of standards means that anything goes as long as the food gets through the supply chain within the product's shelf-life and at a cost that makes the shippers and receivers happy. The "in-transit" phase covers all food movements – from the field to the consumer, from the harvest bin or tractor trailer to your plate.

This book is not specific to any particular type of food or country, but it is intended to provide professionals and advanced students with a sound foundation for the improvement of the transportation sector responsible for the movement of perishable food. It does not cover food handling at load and unload operations. It focuses primarily on the food in-transit, food movers, container sanitation, maintenance and traceability, food safety and quality controls. The book is intended to outline delivery monitoring and control solutions and to provide a standard approach for protecting the food transportation industry, those paying for quality transportation practices, and consumers.

While food safety agencies and certifying bodies have been focused on producer, processor, retail and restaurant food safety, the industry that actually moves the food has been largely overlooked. Millions of dollars are spent annually on food safety systems and visual audits for farms, packing houses, distribution centers, harvest crews, retail outlets, processors and restaurants, but except for a few proactive companies, little has been spent on pressuring food movers to adhere to any set of standards.

Trucks and containers used to move food are often also used to move chemicals and other adulterants during back-haul operations. Truck drivers desiring to save on fuel costs turn off refrigeration units until they are needed. Trans-Pacific shipping containers are held up by incoming customs inspectors

because of a lack of proper paperwork, leaving the food inside to age beyond usefulness. Truck trailers used on farms are not cleaned after moving produce from the field to the packing house. Harvest bins are never cleaned or sanitized after being stacked in the field once the harvest is over.

Such food safety abuses are the result of generations of practice that have focused on how the food looks, in order to make it sell, rather than a concern for consumer health. Food recall data highlighted over the past 10 or so years has increasingly brought food supply safety to the attention of consumers and others. This and a lack of government oversight has resulted in multiple but nonstandardized approaches to food safety that are inspection dependent and that largely ignore the technologies and practices that need to be brought into the solution set.

While the food transportation sector is supposedly governed by the Sanitary Food Transportation Act [1], many food transportation companies are acutely unaware of or unwilling to comply with the Act's sanitation, record-keeping and shipment control requirements. The cold chain transportation industry commonly overlooks these requirements (defined in the newly enacted Food Safety Modernization Act [2]) and Department of Homeland Security administrative rules. This book covers these and other international compliance issues, and moves through vicarious liability and the ever-evolving buyer requirements. Produce pre-cooling operations are explored as a preliminary input to possible sources of adulteration that leave transporters liable for shelf-life and product losses. Short versus extended supply chains are further explored as potentially contributing to a lack of supply chain control. International food transportation solutions are discussed because of similar food transportation control requirements in other regions of the world, and as a result of tendencies to blame foreign food producers for a lack of control over food adulteration.

The advances in technological testing, sanitation, monitoring and traceability that have provided the industry with ample cost-effective solutions are highlighted. Such advances, and a sound understanding of responsibilities and liabilities, provide food transporters with the planning mechanisms needed to move into solid standardized delivery control solutions in line with food safety needs as well as government compliance.

Armed with a foundation of legal, liability, practical solutions and common standards, food transporters and buyers will have a solid foundation that enables them to structure company-wide business practices as part of their overall food safety and quality agenda. For students of food safety and quality, the book provides much needed insight into a critical but overlooked aspect of the food safety and food quality spectrum. This food transporter piece of the overall food safety and quality puzzle provides a much needed link to improve the supply chain communication and interdependence sought by governmental and industry executives.

From a prevention perspective, the book provides links with HACCP (Hazard Analysis and Critical Control Points) and similar process control

structures intended to keep safe quality food moving in a more holistic, integrated manner. The transportation sector is treated as a measurable and manageable process that forms the links critical to an integrated food safety system.

There are perhaps thousands of different types of food transported around the world: frozen living, canned, fresh, fish and meat, milk, cheese, eggs, sprouts, avocados, processed, packaged, clean, dirty, adulterated, contaminated, from Chile to Europe, from the United States to Korea, and from South Africa to Florida. Food transportation and control over it is taken seriously by some companies in some countries, whereas in other countries fresh produce is transported to the morning market in bags slung over a carrier's back.

Some long-distance food carriers have established extremely sophisticated real-time location and temperature measurement systems designed to control food safety and quality, whereas others would rather dump a truckload of overripe tomatoes on the side of the road because the road was rained out and impassable for several days.

No single book could cover such diversity.

Regardless, a system can be established that provides guidance on planning and implementation and standards, and is designed to satisfy both internal management needs and external certification audit requirements.

This book is intended to help begin providing visibility into these areas, and to provide a basis for those companies and food logistics professionals in need of guidance on food safety and quality during transportation.

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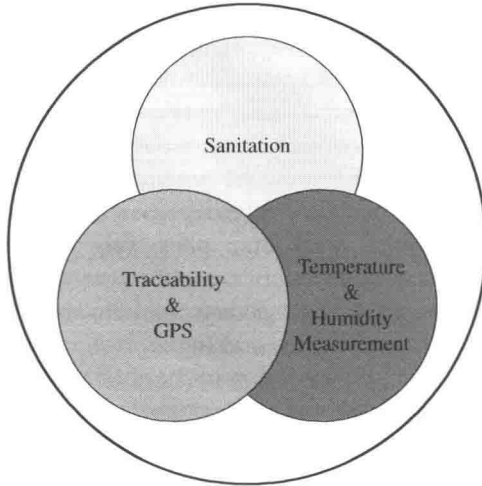
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Introduction to Transporter Container Sanitation, Traceability and Temperature Controls



Food supply chains are subject to the vagaries of a number of regional and international food safety procedures. Distribution centers, farms, processors, retailers, restaurants and packers are besieged by hundreds of different standards, all purporting to 'certify' the operation to whatever food safety audit standards have been developed by compliance bodies

and approved by government agencies. Because of costs, the slowness of analysis and the need to generate business, other than processors following hazard analysis critical control point (HACCP)-type systems, many certification audit practices exclude such basics as testing for biocontaminants, and instead rely on visual inspection by auditors and documentation reviews.

Most people are acutely aware of the numerous recent adulteration outbreaks in the food supply chain and the resulting illnesses and deaths. Spinach, green onions, carrots, peanuts, hamburger and juices are only a few of the publicly reported carriers over the past few years. What most people are not aware of is the extent to which these and similar problems go publicly unreported. For instance, the USDA Food Safety and Inspection Service (FSIS) reported that for the calendar year up to October 2006 there were 29 separate meat recalls across the country [3]. What is interesting about the spinach *E. coli* outbreak is that the retail industry, not the government, voluntarily removed the spinach from the shelves in order to prevent its sale.

The author recently moved from implementing quality systems in high-technology electronics manufacturing companies throughout the US and Asia into a position responsible for implementing a quality system at the Hawaii State Department of Agriculture. When I began my career in technology in 1984, the company where I was a director of quality relied solely on inspection and sorting in order to 'assure' the quality of their products. The factory the company owned in South Korea was operating in a batch-manufacturing mode. Each process step in the product build was followed by a wall of inspectors responsible for sorting the good from the bad, with the bad going to rework or scrap and the good going on to the next process step. Return rates for the final product were at 49%. I have long forgotten the rework rates, but I do remember many shelves piled with materials awaiting rework. The scrap piles were also something to be proud of. There was no corrective action, and incoming materials were purchased based solely on price. Management was convinced they were doing a good job because the company was making money.

INSPECTION AS THE PRIMARY BASIS FOR FOOD QUALITY AND SAFETY

Readers might have gained a clue to this situation by carefully re-reading the first paragraph. The USDA Food Safety and Inspection Service is just that: an inspection service. It relies heavily on inspection, certification and audits. During my 25-year career I have never known those activities to positively affect outgoing quality or cost savings, except where results were used for causal analysis and to drive improvements. Organizations that rely on visual inspection are rarely knowledgeable about prevention. Further, the use of inspection data to drive preventive action is rare.

Preventive action is not the same as what is commonly referred to as 'corrective action'.

Here is a list of Deming's 14 points first published in *Out of the Crisis* [4]. It is interesting to consider how they apply to the food supply and our control over how food is transported from one place to another.

Deming's 14 points

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.
2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.
6. Institute training on the job.
7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.
8. Drive out fear, so that everyone may work effectively for the company.
9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
10. Eliminate slogans, exhortations, and targets for the workforce, asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the workforce.
 - Eliminate work standards (quotas) on the factory floor. Substitute leadership.
 - Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.
11. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.
12. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means, inter alia, abolishment of the annual or merit rating and of management by objective.

13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the company to work to accomplish the transformation.

The transformation is everybody's job.'

Point number 3 'Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.' This is particularly important and applicable in our circumstance.

There is a good deal of discussion nowadays about food quality versus safety. Deming is well known for helping to improve quality, but is that the same as food safety? The 14 points listed above show that our food supply chain is in need of exactly the types of changes he recommended 30 years ago. Food safety and food quality go hand in hand. Both rely on and can be seriously affected by the transportation industry and its ability to improve services.

State, local and federal level governments rely heavily on inspection when involved in food enforcement activities. They believe they will achieve quality with visual inspection, audits and enforcement. Interestingly, with literally thousands of inspections going on, there are few focused on measurement mechanisms that might be established to collect and analyze data or to drive change.

This government reliance on inspection is an anachronism and demonstrates a basic lack of understanding of how to resolve the complex problems of food quality and safety.

In more modern organizations, the terms currently in use include 'six-sigma', 'supply chain management', 'leadership', 'teamwork', 'customer focus', 'data-driven decision-making', 'traceability' and the like. These terms are relatively unknown in agricultural and food supply organizations. Statistical process control (SPC) is unknown, as is the idea that one could actually use statistics to control a process.

Although each of those tool kits might be used effectively depending on the particular situation, they have rarely been thought of or applied in the transportation sector, except by a few forward-thinking companies. In spite of the current food safety outbreaks, this gap is probably due partly to the lack of knowledgeable quality professionals moving into the food safety industry, as there is little demand for such people. Furthermore, current coursework in food science colleges focuses primarily on inspection and compliance audit requirements as a means of achieving quality and safety. This leaves the college-educated food science and food safety communities with a 100-year-old gap in quality improvement practices.

The weak legal framework for food quality and safety is based on weak inspection standards that often intentionally exclude hard and more objective data. With regard to our current interest — the transportation sector — there is virtually no oversight, no measurement, no data, no analysis and no preventive action. Without such data and management, prevention is nearly impossible.

Whereas many laws are enacted with the intention of improving produce quality, implementation and enforcement, except in the case of recalls, are