Hazard Analysis and Critical Control Point (HACCP)

August 24, 2018 Sandesh Adhikari

- HACCP stands for Hazard Analysis and Critical Control Point.
- Originally developed in the 1960's by NASA and a group of food safety specialists.
- According to US Food and Drug Administration, "HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product".
- HACCP is designed for use in all segments of the food industry from growing, harvesting, processing, manufacturing, distributing, and merchandising to preparing food for consumption.
- It is the means of securing food safety from harvesting to consumption.
- Tool to identify the hazards and applying the major for the food safety.
- HACCP can be applied in every step of food processing.

Principle 1: Conduct a hazard analysis.

Principle 2: Determine the critical control points (CCPs).

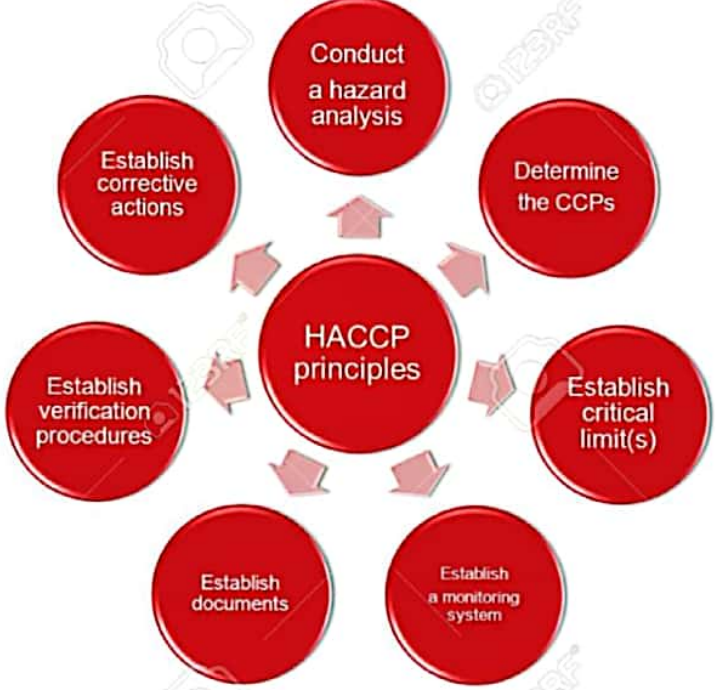
Principle 3: Establish critical limits.

Principle 4: Establish monitoring procedures.

Principle 5: Establish corrective actions.

Principle 6: Establish verification procedures.

Principle 7: Establish record-keeping and documentation procedures.



1. Conduct a hazard analysis:

- Hazard analysis is the very first step.
- All the potential hazards are identified in this step
- The hazard is defined as the any physical, chemical and biological agent that possess the possible risk or threat to the health.
- The basic physical hazards are metal contamination, presence of inedible items. Chemical hazards include the presence of toxins or any unwanted chemicals and biological hazard denote the presence of pathogens.
- Any method that can control these hazards needs to be adopted.

2. Determine the critical control points (CCPs):

- CCP stands for critical control point.
- At this step the control measures can be applied.
- Determination of CCP refers to identifying the point at which the control measures can be applied to eliminate the hazard that has been previously identified.
- CCP is essential to prevent or eliminate hazard or to reduce it to an acceptable level.
- Examples of CCPs may include: Cooking, chilling, metal detection, setting into suitable temperature.

3. Establish critical limits:

- Once the CCP is identified, critical limit points needs to be assigned for each CCP.
- There can be one or more critical limits for each CCP
- Critical limits are defined as the maximum and/or minimum value of CCP such that the hazards are controlled and food safety is assured.
- Critical limits must be defined on the scientific grounds and basis
- Critical limits are usually based on factors such as: temperature, time, physical dimensions, humidity, moisture level, water activity (a_w), pH, regulatory levels, etc.

4. Establish monitoring procedures

- Generally, refers to the planning and carrying out monitoring for CCP
- Monitoring should be done on regular basis
- Monitoring technique may differ based on the CCP
- Monitoring is necessary to identify the deviation and apply the effective measures
- Monitoring is also necessary for future purpose and verification as monitoring process is documented.

5. Establish corrective actions

- Corrective action is taken when the critical limit is not met
- Corrective actions are pre-decided for each CCP
- These actions make sure that no any harmful product reaches the market for consumption

6. Establish verification procedures

- HACCP plan must be validated.
- For testing the validity of the plan several steps can be taken such as checking out the random samples, reviewing the process, confirming that the CCP are under control.
- Verification activities can be carried out by the external hired officers or the internal members.
- No matter who performs the verification, it should be unbiased and fairly carried out.

7. Establish record-keeping and documentation procedures

- Record keeping is must in HACCP
- Records maintained should have the records or information regarding HACCP plan, CCP, critical limits, monitoring, corrective action, all the procedures including the verification procedures.
- Recording keeping is necessary of validation and proper application of HACCP.

Benefits of HACCP:

- Ensures the consumer regarding the safety of the product
- Prioritizes food safety and works to eliminate any kind of hazard
- Necessary for the consistent quality products
- Provides the framework to produce foods safely and to prove they were produced safely.
- Prevents from the possible health outcomes that could have occurred due to mishandling during food production steps
- HACCP is also necessary for obtaining validation.

THE USE OF HACCP AS A FOOD SAFETY MANAGEMENT SYSTEM

Since the 1960's, food safety professionals have recognized the importance of HACCP principles for controlling risk factors that directly contribute to foodborne illness. The principles of HACCP embody the concept of active managerial control by encouraging participation in a system that ensures foodborne illness risk factors are controlled.

HACCP is not a stand-alone program, but is built upon a foundation of operational practices called prerequisite programs (discussed in Chapter 3). The success of a HACCP program (or plan) is dependent upon both facilities and people. The facilities and equipment should be designed to facilitate safe food preparation and handling practices by employees. Furthermore, FDA recommends that managers and employees be properly motivated and trained if a HACCP program is to successfully reduce the occurrence of foodborne illness risk factors. Instilling food worker and management commitment and dealing with problems like high employee turnover and communication barriers should be considered when designing a food safety management system based on HACCP principles.

Properly implemented, a food safety management system based on HACCP principles may offer you the following other advantages:

- Reduction in product loss
- Increase in product quality
- Better control of product inventory
- Consistency in product preparation
- Increase in profit
- Increase in employee awareness and participation in food safety

What are the seven HACCP principles?

The 1997 National Advisory Committee for the Microbiological Criteria for Foods (NACMCF) recommendations updated the seven HACCP principles to include the following:

1. **Perform a Hazard Analysis.** The first principle is about understanding the operation and determining what food safety hazards are likely to occur. The manager needs to understand how the people, equipment, methods, and foods all affect each other. The processes and procedures used to prepare the food are also considered. This usually involves defining the operational steps (receiving, storage, preparation, cooking, etc.) that occur as food enters and moves through the operation. Additionally, this step involves determining the control measures that can be used to eliminate, prevent, or reduce food safety hazards. Control measures include such activities as implementation of employee health policies to restrict or exclude ill employees and proper handwashing.

2. **Decide on the Critical Control Points (CCPs).** Once the control measures in principle #1 are determined, it is necessary to identify which of the control measures are absolutely essential to ensuring safe food. An operational step where control can be applied and is essential for ensuring that a food safety hazard is eliminated, prevented or reduced to an acceptable level is a critical control point (CCP). When determining whether a certain step is a CCP, if there is a later step that will prevent, reduce, or eliminate a hazard to an acceptable level, then the former step is not a CCP. It is important to know that not all steps are CCPs. Generally, there are only a few CCPs in each food preparation process because CCPs involve only those steps that are absolutely essential to food safety.

3. **Determine the Critical Limits.** Each CCP must have boundaries that define safety. Critical limits are the parameters that must be achieved to control a food safety hazard. For example, when cooking pork chops, the *Food Code* sets the critical limit at 145 ºF for 15 seconds. When critical limits are not met, the food may not be safe. Critical limits are measurable and observable.

4. **Establish Procedures to Monitor CCPs.** Once CCPs and critical limits have been determined, someone needs to keep track of the CCPs as the food flows through the operation. Monitoring involves making direct observations or measurements to see that the CCPs are kept under control by adhering to the established critical limits.

5. **Establish Corrective Actions.** While monitoring CCPs, occasionally the process or procedure will fail to meet the established critical limits. This step establishes a plan for what happens when a critical limit has not been met at a CCP. The operator decides what the actions will be, communicates those actions to the employees, and trains them in making the right decisions. This preventive approach is the heart of HACCP. Problems will arise, but you need to find them and correct them before they cause illness or injury.

6. **Establish Verification Procedures.** This principle is about making sure that the system is scientifically-sound to effectively control the hazards. In addition, this step ensures that the system is operating according to what is specified in the plan. Designated individuals like the manager periodically make observations of employees' monitoring activities, calibrate equipment and temperature measuring devices, review records/actions, and discuss procedures with the employees. All of these activities are for the purpose of ensuring that the HACCP plan is addressing the food safety concerns and, if not, checking to see if it needs to be modified or improved.

7. **Establish a Record Keeping System.** There are certain written records or kinds of documentation that are needed in order to verify that the system is working. These records will normally involve the HACCP plan itself and any monitoring, corrective action, or calibration records produced in the operation of a the HACCP system. Verification records may also be included. Records maintained in a HACCP system serve to document that an ongoing, effective system is in place. Record keeping should be as simple as possible in order to make it more likely that employees will have the time to keep the records.

How can HACCP principles be used in retail and food service operations?

Within the retail and food service industries, the implementation of HACCP principles varies as much as the products produced. The resources available to help you identify and control risk factors common to your operation may also be limited. Due to this diversity, implementation of "textbook" HACCP is impractical in most retail and food service establishments.

Like many other quality assurance programs, the principles of HACCP provide a common-sense approach to identifying and controlling risk factors. Consequently, many food safety management systems at the retail level incorporate some, if not all, of the principles of HACCP. While a complete HACCP system is ideal, many different types of food safety management systems may be implemented to control risk factors. It is also important to recognize that HACCP has no single correct application. Variations in the procedures presented in this Manual are appropriate as long as they are based on sound public health judgment. In addition to the material presented in the text of this Manual, several references have been provided in Annex 1 to assist you in developing a food safety management system specific to your operation.