HACCP Food safety System

HACCP stands for Hazard Analysis and Critical Control Point. HACCP is a systematic approach to the identification, evaluation, and control of human and animal food safety hazards.

A hazard is a biological, chemical, or physical agent that is reasonably likely to cause illness or injury in the absence of a control.

HACCP includes analysis and control of hazards from:

- raw material production.
- procurement and handling.
- manufacturing, distribution, and transportation.
- consumption of the finished product

A HACCP system alters the focus of food safety from reactive to proactive, a preventive method for ensuring safe food.

Hazard Analysis Critical Control Points (HACCP) is a systematic approach to the identification, evaluation, and control of food safety hazards prevention based system to assure food safety.

The HACCP team works step-by-step through the seven HACCP principles.

Diagram of the seven HACCP principles

Principle 1: Conduct a hazard analysis
Principle 2: Determine critical control points
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

Seven HACCP Principles:

1.) Conduct a Hazard Analysis

Conduct a Hazard Analysis:

- Hazard analysis identifies a list of biological, radiological, chemical, and physical hazards in the food. It also identifies where controls can be applied to prevent, eliminate, or reduce the hazard to an acceptable level.
- Hazard analysis identifies a list of biological, chemical, and physical hazards in the food.

- A hazard analysis is conducted to identify significant hazards. Also identify where controls can be applied to prevent, eliminate, or reduce the hazard to an acceptable level.

2.) Determine Critical Control Points

Determine Critical Control Points:

- A Critical Control Point (CCP) is a step where a control is applied to prevent, eliminate, or reduce an identified hazard. If the hazard is only reduced, it must be to an acceptable level.
- Complete and accurate identification of all CCPs is fundamental to controlling food safety hazards in the process.

3.) Establish Critical Limits

Establish Critical Limits:

- A Critical Limit (CL) is defined as a value at which a biological, chemical, or physical parameter must be controlled at a critical control point.
- This ensures that food safety hazards are prevented, eliminated, or reduced to an acceptable level.

4.) Establish Monitoring Procedures

Establish Monitoring Procedures:

- Monitoring is a planned sequence of observations or measurements of the critical limit to assess whether a critical control point is under control.

5.) Establish Corrective Action

Establish Corrective Action:

- A corrective action is a procedure that is followed when a deviation from the critical limit occurs.
- The HACCP plan will establish corrective actions and the person responsible for implementing each corrective action. This occurs whenever there is a deviation from established critical limits. Corrective actions work to preclude a repeating the deviation.

6.) Establish Verification Procedures

Establish Verification Procedures:

- Verification procedures are activities, other than monitoring, that determine the validity of the HACCP plan. They ensure that the system is operating according to the plan.
- Frequent reviews to verify the HACCP plan is being correctly followed may prevent the need for end-product testing. Verification activities are carried out by individuals within a facility, third-party experts, and regulatory agencies.

7.) Establish Record Keeping and Documentation Procedures

Establish Record Keeping and Documentation Procedures:

- Record-keeping and documentation include:
    - The HACCP plan.
    - Rationale for determining hazards and control measures.
    - Validation records.
    - Records generated during the operation of the plan.
- The HACCP plan establishes procedures for recordkeeping, how critical limits will be recorded, and documentation related to the HACCP plan.

Five Preliminary Steps

In the development of a HACCP Plan, there are five preliminary steps that need to be completed.

This step-by-step procedure involves gathering information about the products and the process.

1. Assemble the HACCP team.
2. Describe the food and its distribution.
3. Describe the intended use and consumers.
4. Develop a flow diagram.
5. Verify the flow diagram.

1.)   Assemble the HACCP Team

Assemble the HACCP Team:

- Assembling a HACCP team is an important step in building a HACCP plan. Management should assemble the HACCP team and assign a HACCP coordinator who will lead and guide the team through the process. HACCP team members should have specific knowledge and expertise appropriate to the product and process.

The HACCP team is the group of people involved in the development, implementation, and maintenance of the HACCP system.

The team is responsible for developing the HACCP plan and is tasked with verifying and implementing the HACCP plan. In addition, the HACCP team is responsible for updating the HAACP plan annually or when product and processing changes occur.

Both the facility and the personnel involved in the development of the HACCP plan must be totally committed to its implementation.

2.) Describe the Food and its Distribution

Describe the food and its distribution:

The next step is to describe the food by listing the:

- Finished product description.

- Ingredients.
- Packaging.
- Method of distribution.

3.) Describe the Intended Use and Consumers

Describe the Intended Use and Consumers:

- The HACCP Team determines the intended use, such as the general public, infants, immunocompromised individuals, or the elderly.
- For animal food, the HACCP team should be aware of specific safety concerns for the intended species, age, and class of the animal.

4.) Develop a Flow Diagram

Develop a Flow Diagram:

- Develop an accurate process and detailed process flow diagram. A flow diagram provides an important tool that the HACCP team can use to identify and describe the process.
- The flow diagram must cover all the steps in the process.
- In addition to the flow diagram, a written process description can be a tool to explain what happens at each processing step. This description can be used as a reference for the development of the HACCP plan.

5.) Verify the Flow Diagram

Verify the Flow Diagram:

- The HACCP team should verify the accuracy and completeness of the flow diagram by following the flow of product through the facility from receiving to distribution.

Prerequisite Programs

A HACCP system must be built upon a solid foundation. The HACCP team will incorporate the needed prerequisite programs into the plan. Prerequisite programs provide sanitary conditions for the general operating environment and procedures necessary for the production of safe food.

Prerequisite programs will be covered in Unit 3 of this HACCP course.

Benefits of a HACCP System

HACCP-based procedures provide facilities with an effective system for control of food safety. The preventive approach of HACCP-based procedures not only improves food safety management but also complements other quality-management systems.

Several benefits of HACCP-based procedures include:

- Helping to reduce or eliminate consumer illness.
- Increasing food safety standards.

- Ensuring compliance with the law.
- Helping to produce safe food.

HACCP focuses on food safety by identifying significant hazards at each step in the process and implementing controls at those steps.

HACCP is a proactive strategy that has been shown to be an effective method for preventing food safety problems.

By using a HACCP approach, the root causes of food safety issues can be identified.

In a HACCP system, the facility management is ultimately responsible for food safety.

Voluntary or Regulatory

HACCP is mandatory in many facilities that process food. There are specific laws and guidelines which must be followed. Failure results in regulatory actions. This was briefly discussed earlier in this unit.

There are many facilities that are not required by law to have a HACCP system, but they use the HACCP approach to food safety voluntarily.

Retail food facilities are not required to have HACCP unless they conduct specific processes, which are explained in the Food Code.

In the Laws, Regulations, and Guidance Unit, more information will be given concerning facilities that have regulatory (mandatory) HACCP and facilities that voluntarily use the HACCP approach to food safety.

Management Support

Resources are needed to develop and implement HACCP in an operation. When developing a HACCP plan, it is important to have the support of management. Food safety programs work best when they are fully supported and promoted by the management of an operation.

Management commitment is critical for the development and continual review and improvement of the HACCP plan. This helps build a food safety culture that will resonate with all employees.

Management must be dedicated to HACCP implementation from the onset.

If there is a lack of commitment, including lack of financial or labor resources, the HACCP plan may not be properly implemented.

This may lead to an increased chance of system failure. Upper management must be fully aware of HACCP and the benefits to be realized. They also need to understand the challenges the facility may face.

The Importance of a Hazard Analysis

The first step that must be taken when developing a HACCP plan is to identify all the potential significant hazards that may be associated with a particular food product and the process used to produce it.

If all the potential significant hazards have not been identified, they will not be addressed in the HACCP plan and the resulting HACCP plan will be inadequate.

The hazard analysis is the process that is used to identify all of the potential significant hazards that may be associated with a food product.

All of the other decisions that will be made during the development and implementation of a HACCP plan will be based on how to address and control the significant hazards that were identified during the hazard analysis.

The effectiveness of any HACCP plan is dependent on the accuracy of the hazard analysis.

The hazard analysis can be described as the basis or the building block on which the HACCP plan is designed and built.

It is therefore crucial that the team conducting the hazard analysis be completely knowledgeable about the ingredients, equipment, and process used to produce the food product. This knowledge must include all potential physical, chemical or biological hazards that can be associated with the ingredients, equipment, facility design, and process used to manufacture the product(s).

Every conceivable hazard that could occur during any stage of the manufacturing process, as well as those that could arise post-production, must be identified and analyzed.

The hazard analysis must both identify the potential hazards and evaluate the risks associated with the identified hazards which will be used during the development of the HACCP plan. When this process is properly completed, all the significant hazards associated with the food product and the process will be identified.

Not all risks identified during the hazard analysis will be determined to be significant.

The fact that the HACCP plan is built on the information gathered from the hazard analysis emphasizes the importance of the hazard analysis.

If the hazard analysis is flawed or incomplete, the HACCP plan will be inadequate and will allow the possibility of unsafe food being produced by the facility.

Critical Control Point

Once all hazards are identified and evaluated, the next step in the development of a HACCP plan is to determine the Critical Control Points (CCPs).

A critical control point is a step in a process where control can be applied to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

It is important to note that many HACCP plans contain only one critical control point. However, depending on the type of food product produced and the process used in production, some HACCP plans may contain multiple critical control points.

Critical Limit

The Seven Principles of HACCP define a critical limit as "a maximum and or minimum value to which a biological, chemical or physical parameter must be controlled at a critical control point (CCP) to prevent, eliminate or reduce to an acceptable level of occurrence of a food safety hazard."

Heat processing

Cooling, refrigerating, and freezing

Proper labeling

Safe handling

Critical Control Points Compared to Critical Limits

The definitions on the two previous pages explain that a critical control point is the location in a process where a hazard can be controlled, while the critical limit is the measurable value that must be met at the critical control point to effectively control the food safety hazard.

Relationship Between a Critical Control Point and a Critical Limit

Every critical control point must have a critical limit associated with it. If there is no critical limit associated with it, then it is not a critical control point.

Even though they have different meanings, the two terms have a strong correlation.

Importance of a Systematic Approach in Relation to the Seven Principles of HACCP

The seven principles of HACCP were developed as a systematic approach to identify and control significant food safety hazards during the production of food products.

By applying the seven principles of HACCP when developing, implementing and maintaining a HACCP plan, the facility will have a proactive plan that will be an effective tool to prevent the production of unsafe food.

An advantage of a well-designed and properly implemented HACCP plan is that it will allow the facility to recognize trends that can be addressed before a critical limit has been exceeded

A brief overview of the systematic approach is as follows.

- It is a very logical, sequential process to first conduct a hazard analysis to identify the potential significant hazards (Principle 1). The next step is to identify the critical control point(s) in the process (Principle 2).

- Once the critical control points are identified, the critical limits associated with them must be determined (Principle 3). The next step in the process is to establish monitoring procedures to document that the critical limit(s) were met (Principle 4).

- This is followed by the establishment of corrective actions that are taken if a critical limit is not met (Principle 5). The next step is to establish verification procedures to ensure that the HACCP plan is scientifically sound and working as intended (Principle 6).

- The final step is the establishment of a recordkeeping system to document the results generated by the HACCP plan and its verification activities (Principle 7).

- By following the systematic approach in relation to the seven principles of HACCP that was described on the previous pages, an adequate HACCP plan should be developed that would prevent the production of unsafe food products, if it is implemented properly.

- This systematic approach would also include a comprehensive, unbiased evaluation of the food product being produced and the facility in which it is being produced.

Elements of a Corrective Action

A corrective action is taken any time there is a deviation from an established critical limit. An important purpose of corrective actions is to prevent potentially adulterated or hazardous food from being consumed.

The four major elements of corrective actions are:

- To describe who is responsible for implementing corrective actions.

- To determine and correct the cause of the deviation.

- To identify and determine the disposition of the non-compliant product.

- To record the corrective actions that were taken.

- Specific corrective actions should be developed in advance and should be included as part of the written HACCP plan.

-
- Many HACCP plans include a corrective action form that is to be completed and maintained as part of the HACCP records any time a critical limit is not met. This form is not required, but it helps remind employees of the steps that have to be taken and meets the recordkeeping requirement.

Record Review for Accuracy

- HACCP Principle 6 requires that verification procedures are established that determine the validity of the HACCP plan. One of the validation activities is to determine if the recordkeeping procedures are appropriate and adequate.

-
- It is important that the HACCP plan contain provisions to review the HACCP records for accuracy. It should be apparent that if the records are not accurate, they cannot support the validity of the HACCP plan.