



THE  
SANITARY  
DESIGN  
WORKSHOP

BEMA





Equipment & Plant Design  
For Allergen/Pathogen Control in Low Moisture Foods

# Part 6a: Sanitary Design Principles – Facilities

Presented by:  
Rick Stokes

Sanitary design is integral to food safety.

# Learning Objectives / Agenda

- Three Themes of Facility Design
- Introduction to GMA(CBA) Sanitary Design Principles for Facilities
- Understand Facilities Sanitary Design & Execution – Examples
- Summarize Sanitary Design for Facilities

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- **Three Themes of Facility Design**
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# Three Themes

1. Facility and infrastructure sanitary design provides an environment that enables producing safe food products
2. Design decisions directly influence moisture control, sanitation effectiveness and food safety risk
3. Food Safety is enabled – or defeated – by facility design

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# Sanitary Design Principles for Facilities

1. Distinct hygienic zones established in the facility
2. Control the movement of personnel and material flows to reduce hazards
3. Water accumulation controlled inside facility
4. Room airflow & room air quality controlled
5. Site elements facilitate sanitary conditions
6. Building envelope facilitates sanitary conditions
7. Interior spatial design facilitates sanitation
8. Building components and construction facilitate sanitary conditions
9. Utility systems designed to prevent contamination
10. Sanitation integrated into facility design

# Why Use the GMA/CBA Checklist?

- Comprehensive guide to Sanitary Design
- Aids in developing a sanitation-friendly facility
- Used to audit existing facilities to help with improvement

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- Three Themes of Facility Design
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- **Understand Facilities Sanitary Design & Execution – Examples**
- Summarize Sanitary Design for Facilities

# Principle 1

Distinct hygienic zones  
established in the facility

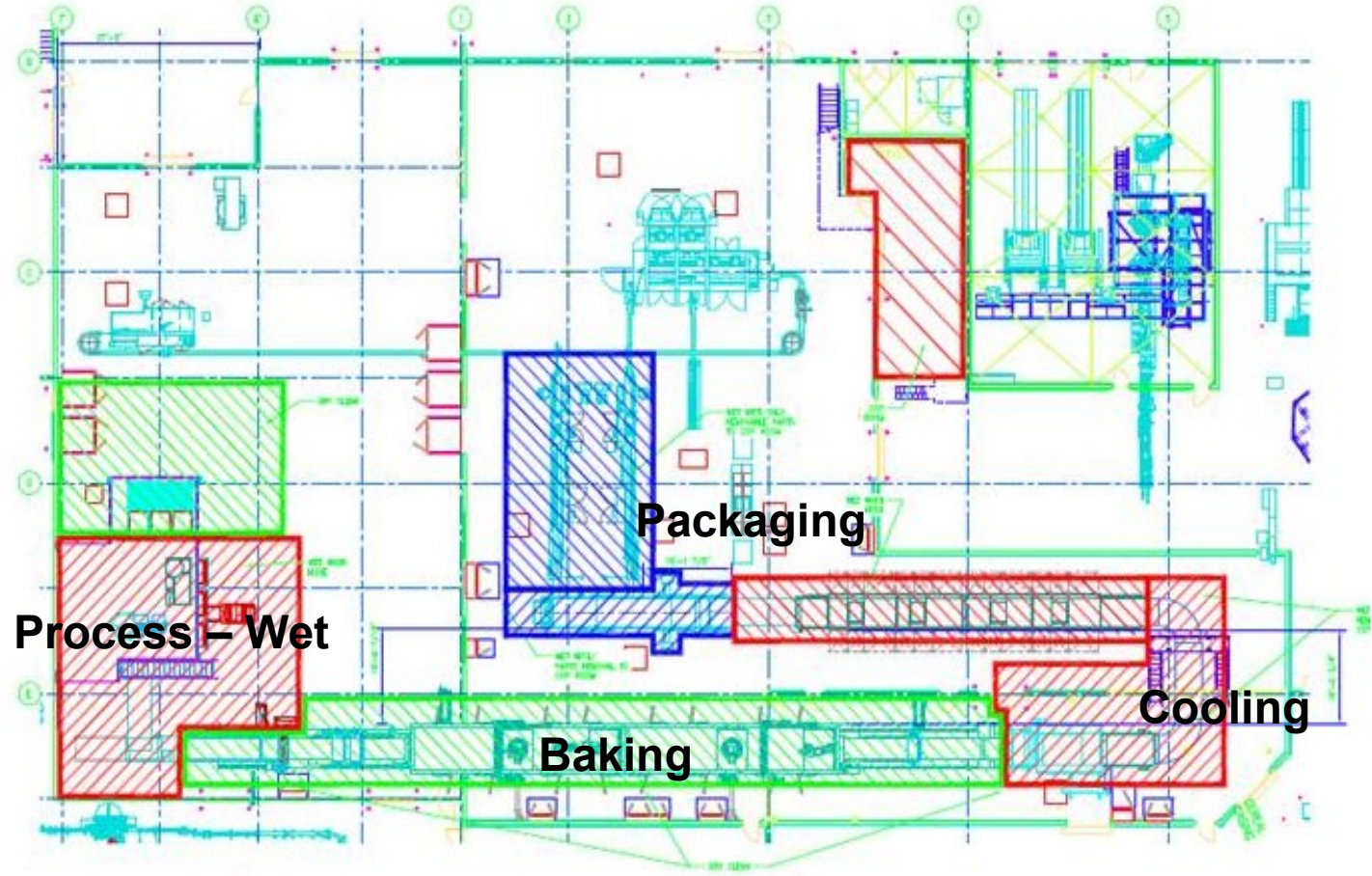
# Determining Hygienic Design Criteria

- Different facilities need different hygienic standards
- Compare
  - Mill – dried grains (risk = mainly pest management)
  - Milk production – raw milk pasteurized and packaged (risk = microbiological)
  - Dry flavor house – dry spices and other flavors 9Risk = many allergens, *salmonella*

# Hygienic Design Criteria Steps

1. Determine products to be produced
2. Risk assessment to identify hazards
3. Determine cleaning objective to manage hazards (e.g. micro, allergen, or quality)
4. Determine cleaning type to meet cleaning objectives (wet, dry, combination, CIP, COP)
5. Determine hygienic design criteria

# Hygienic Zones



Principle 1

# Zoning Alternatives



**From This**

**To This More**

**Design**

**Sanitary Design**

**Principle 1**

# Zoning Alternatives

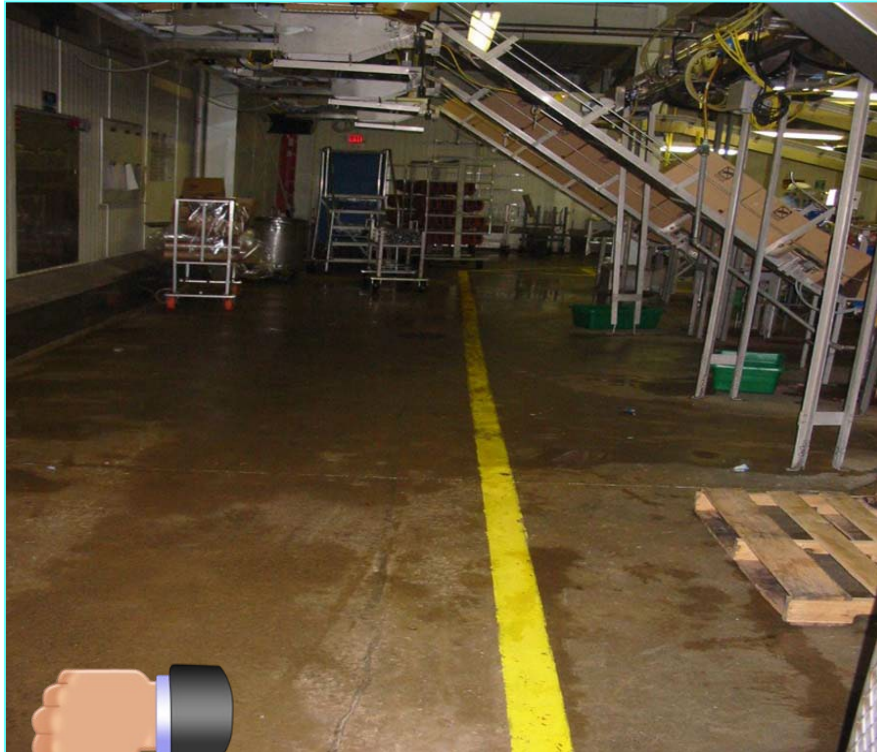


**Principle 1**

# Principle 2

Control the movement of  
personnel and material flow  
to reduce hazards

# Passive & Active Controls



Passive controls rely on administrative procedures, training and auditing to ensure success



Active controls rely on engineered solutions such as physical barriers

## Principle 2

# Control of Movement



**Principle 2**

# Best Practice – Personnel Movement



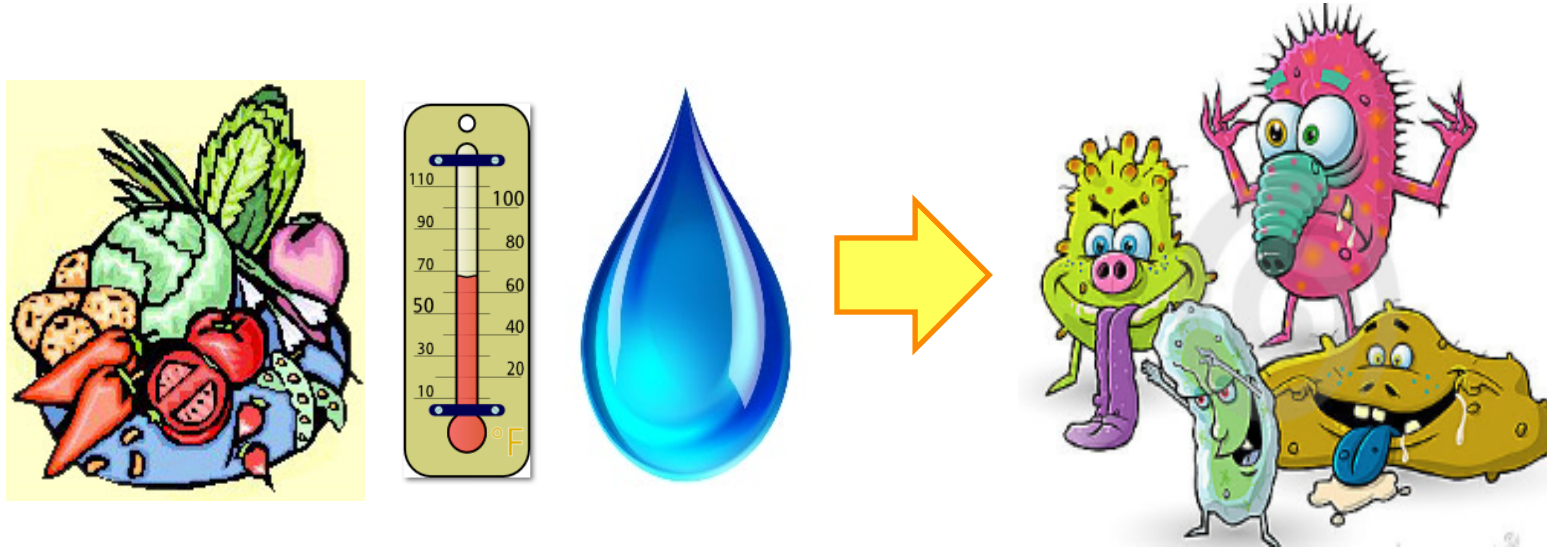
Principle 2

# Principle 3

Water accumulation  
controlled inside facility

# Micro Growth Factors

Nutrients (food) + Water + Temperature =  
Micro Organisms



Principle 3

# Create a Controllable Environment

Control two of the critical factors that affect the growth of microorganisms:

- Moisture
- Temperature
- Drier facility, easier to control microbial growth
- Design a wet process to manage water and control the risk

Principle 3

# Tools to Control Environment

- Bias away from water use
- Dry clean when possible
- Quality roofing
- Insulation of cool surfaces
- Manage air quality
- Move water from sensitive spaces
- Vestibules with airlocks

## Principle 3

# Water Control



From This

To This More

Design

Sanitary Design



**Principle 3**

Sanitary design is integral to food safety.

# Water Control



**Principle 3**

# Principle 4

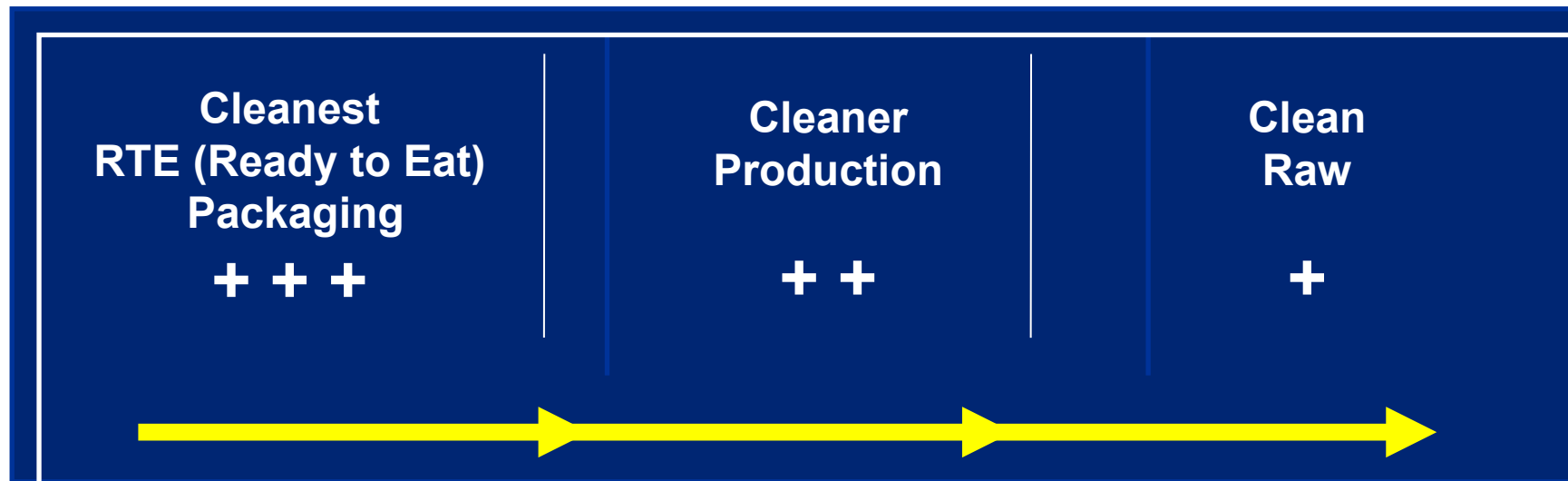
Room air flow & room air  
quality controlled

# How to Clean to a Microbiological Level?



**Principle 4**

# Control Airflow



## Principle 4

# Principle 5

Site elements facilitate  
sanitary conditions

# Perimeter Pest Control



**Principle 5**

# Principle 6

Building envelope facilitates  
sanitary conditions

# Design Considerations - Birds



From This

Design

To This More

Sanitary Design



**Principle 6**

Sanitary design is integral to food safety.

# Roofing



**Principle 4**

# Wall Penetrations



From This

To This More

Design

Sanitary Design



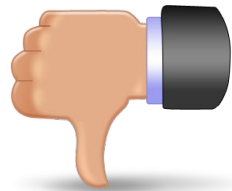
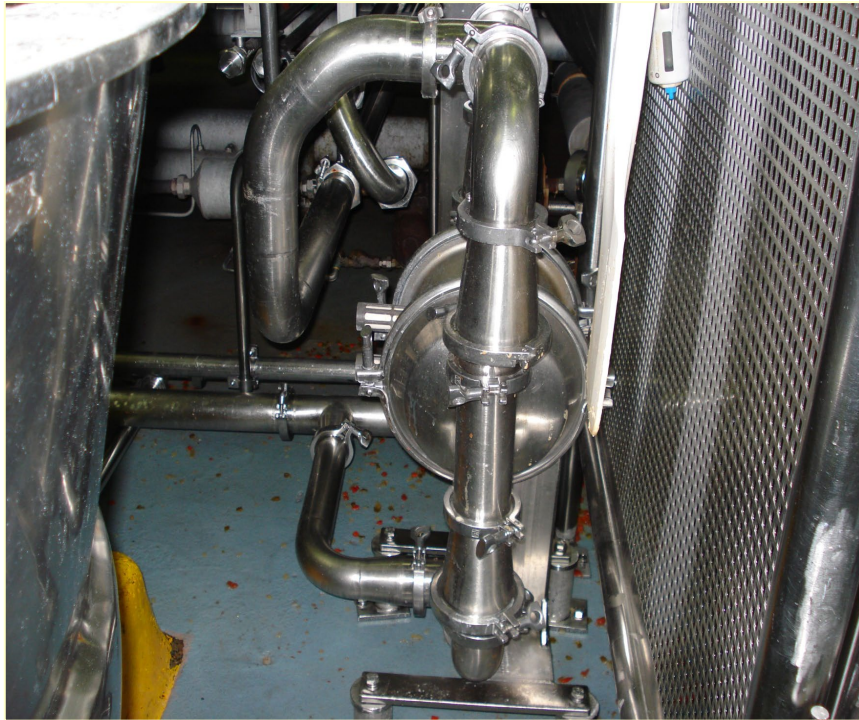
**Principle 6**

Sanitary design is integral to food safety.

# Principle 7

Interior spatial design  
facilitates sanitation

# Access Considerations



From This

To This More

Design

Sanitary Design

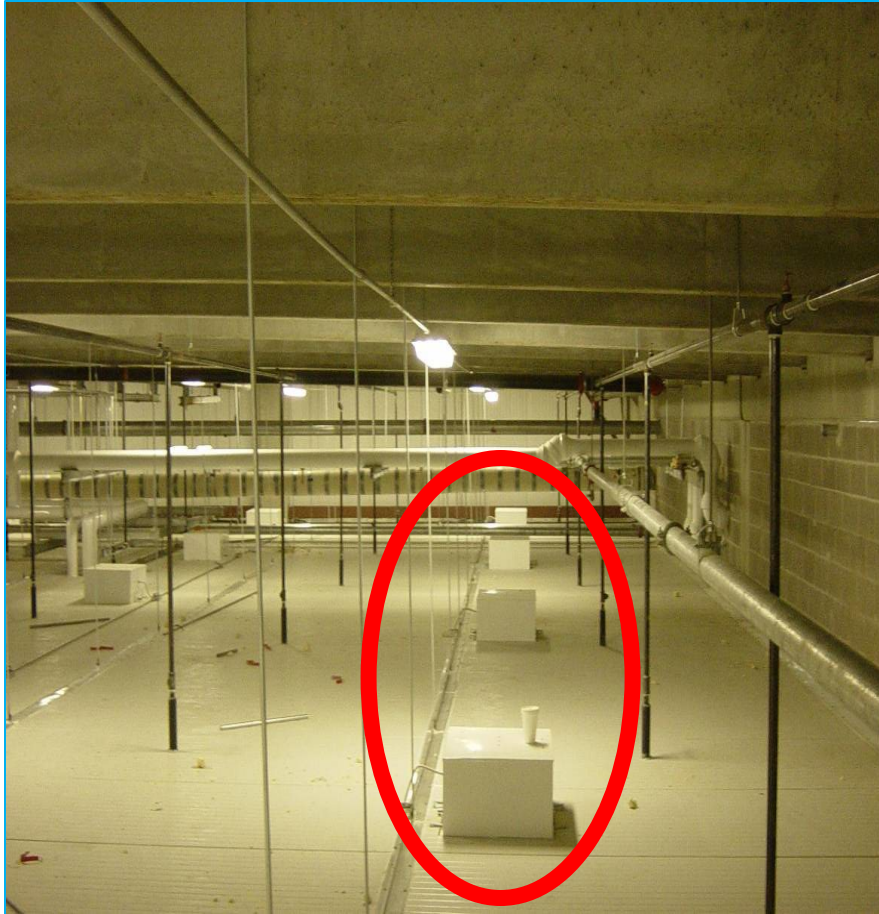


**Principle 7**

# Principle 8

Building components and construction facilitate sanitary conditions

# Lofts



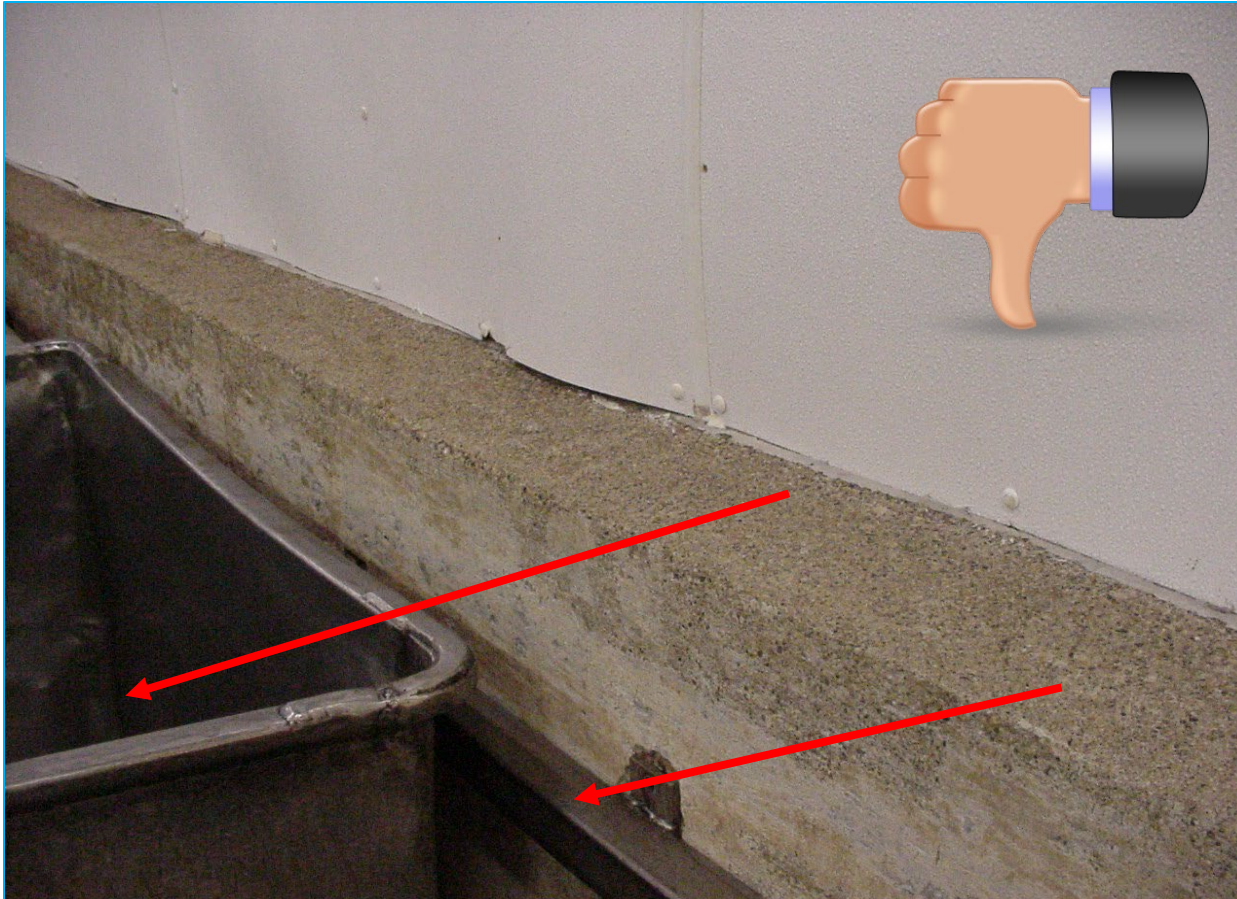
**Light enclosures**



**Principle 8**

Sanitary design is integral to food safety.

# FRP (Fiber-Reinforced Plastic) Facing is Factory Laminated or Foamed-in-Place to Insulation



## Risk:

Concrete chips  
contamination

## Solution:

Stainless steel  
spacer

## Principle 8

# Cold Truth about Freezers



**Principle 8**

# Principle 9

Utility systems designed to  
prevent contamination

# Piping & Conduits are Located & Spaced to Facilitate Access, Cleaning & Sanitation



**Principle 9**



**Sanitary design is integral to food safety.**

# Catwalks & Platforms



**Principle 9**

**Sanitary design is integral to food safety.**

# Principle 10

Sanitation integrated into  
facility design

# Wet Requirements



**Principle 10**



# Dry Requirements



**Principle 10**

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# Sanitary Design Wrap-Up

- Sanitary design principles support food safety
- Implement through early management
  - In room & present
- Chances are, you will need to educate team
  - Need to sell ideas
- Use all your resources
  - Know & reach out to your SME's (Subject Matter Experts)
- Sanitary design can positively affect total costs when implemented properly
  - “How ‘bout we don’t?”

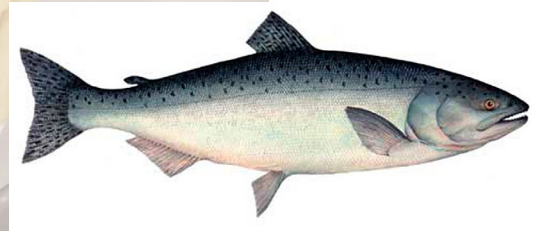
# Questions??

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**Interactive  
Scenario**

# **PART 5 - FACILITIES**



# Interactive Scenario – Allergen Control

- R&D is planning to add a new snack variety: Chips with Pecan-coated Salmon Nuggets
  - The nuggets will be added at the metered particulate feeder in packaging
- We are currently dry cleaning, but is proving ineffective for allergen control
  - The pecan pieces are getting stuck in the equipment
  - The salmon is creating an oily sheen on all surfaces
- We need to address the non-conformance!

# Group 1

## Design Focus

- Sanitary design considerations when changing cleaning methods?
- Questions Engineering should ask before making equipment or infrastructure changes?
  - Utilities
  - Water containment
- What additional information is needed?

# Group 2

## Sanitation Focus

- Sanitation considerations?
  - Can we wet clean?
  - Sanitation needs?
- Sanitation's impact on the packaging environment?
  - Associated risks
- What additional information is needed?

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