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# SANITARY DESIGN CONCEPTS

ALASKA FOOD PROTECTION TASK  
FORCE WORKSHOP

APRIL 27, 2021

PRESENTER: VIRGINIA NG,  
SEAFOOD PRODUCTS ASSOCIATION

# BIOFILM FORMATION

1. Attachment

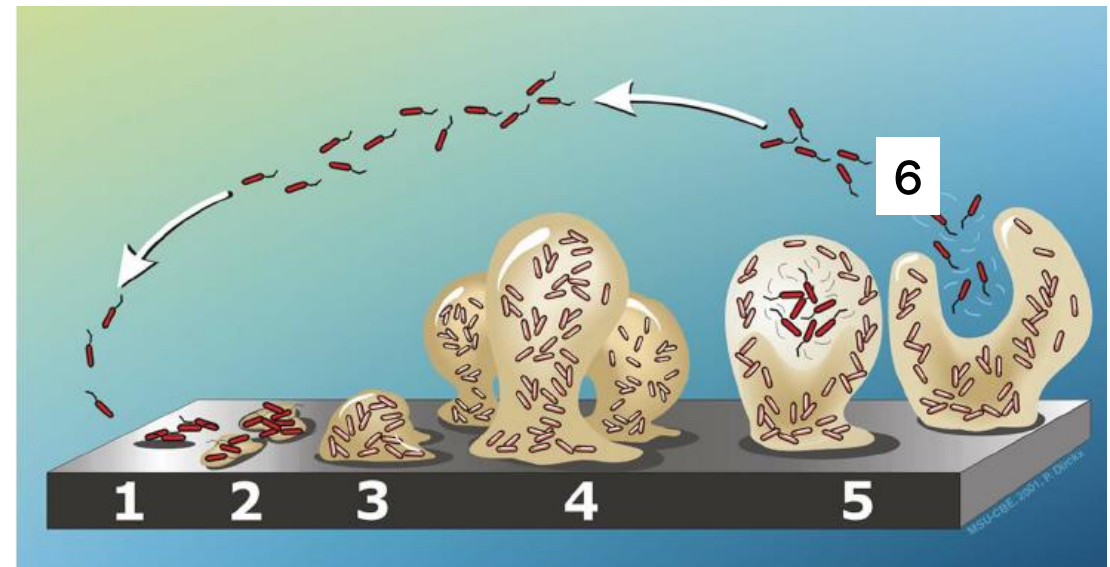
2. Cell cell Adhesion

3. Proliferation

4. Maturation

5. Dispersion

6. Back to Planktonic Bacteria





# L. MONOCYTOGENES BIOFILMS

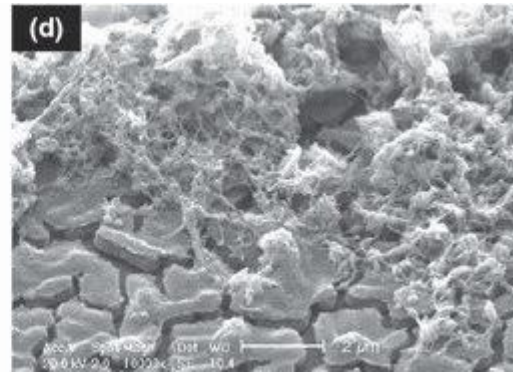
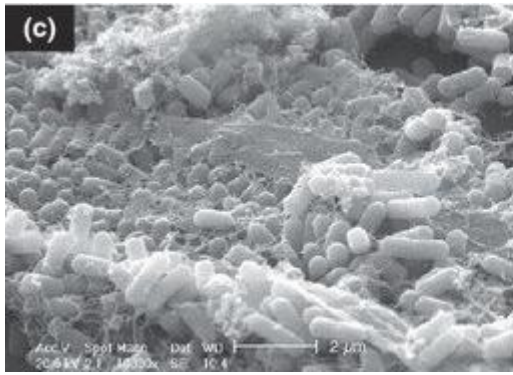
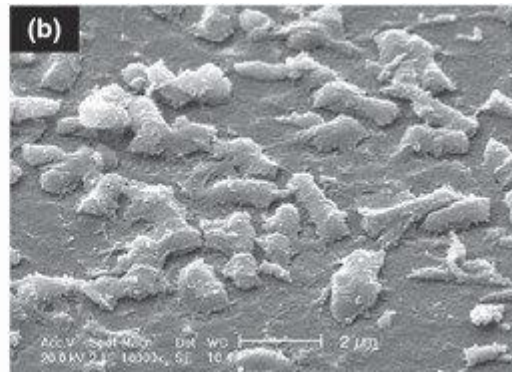
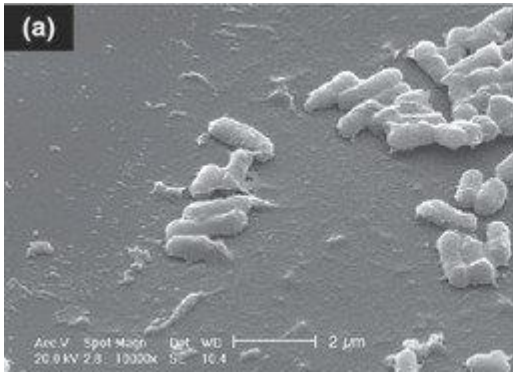
4°C

12°C

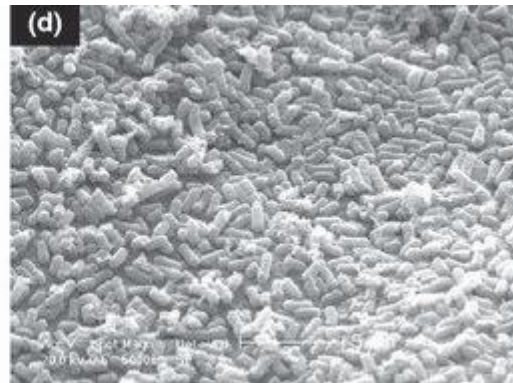
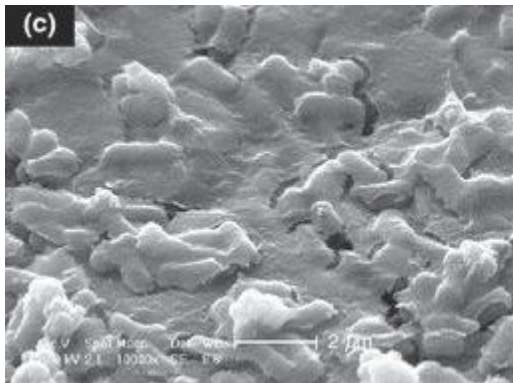
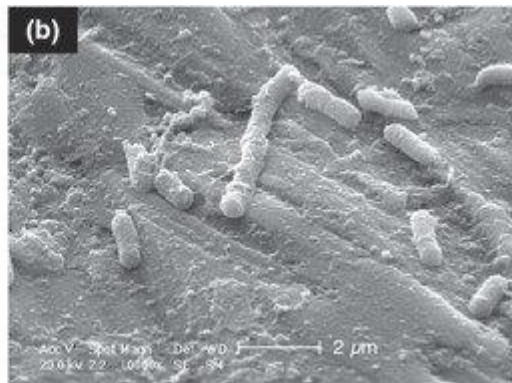
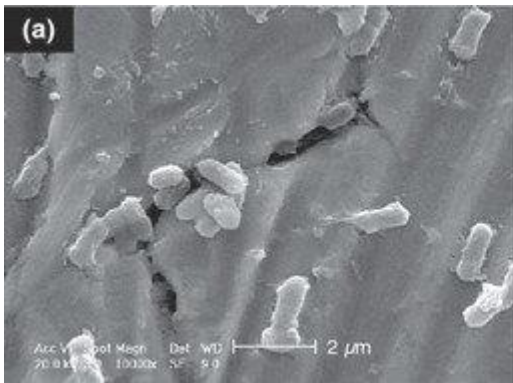
22°C

37°C

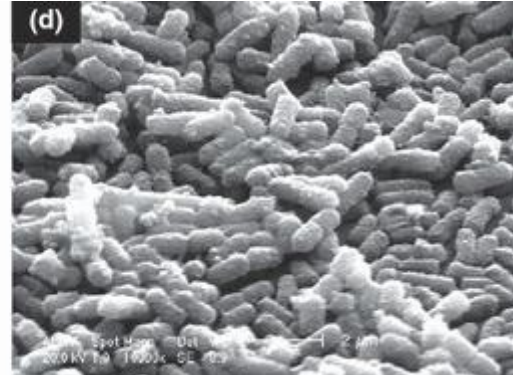
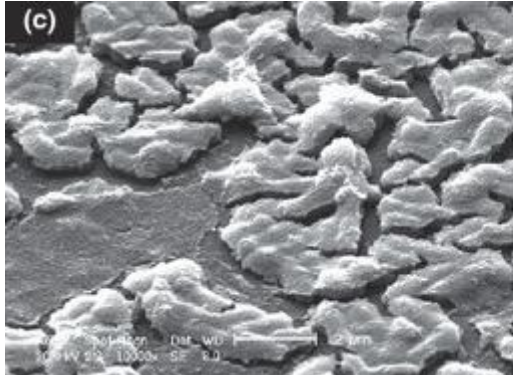
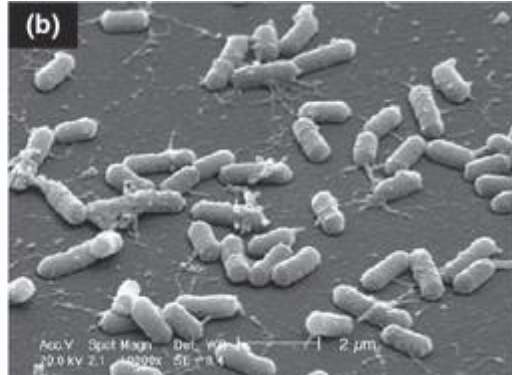
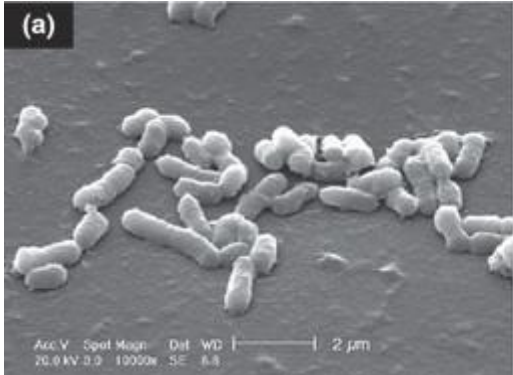
Glass



Stainless Steel



Polystyrene



## SANITARY DESIGN

- When in a food processing plant, the equipment and the facility are constructed so they are easy to clean, resulting in a likelihood of producing safe food product.





# HYGIENIC RESTORATION

TO MAKE CHANGES THAT ALLOW FOR  
BETTER CLEANING, SANITIZING AND  
INSPECTION.





## **BENEFITS OF SANITARY DESIGN CONCEPTS**

- Microbiological control
- Allergen control
- Foreign Material control
- Pest control
- Human safety
- Productivity over the lifecycle of the equipment or structural asset



# THE TEAM

**Production**                      **QA**  
**Managers**                      **Maintenance**                      **Sanitation**



# Is it Designed with Sanitation in Mind?

Here's some questions to ask yourself to help you look at equipment and facilities in a new sanitary design way.

## 1 Would you lick it?

Is it really clean? Even after the best cleaning, if the answer to the question is still no, there is a good chance that the equipment isn't designed effectively to properly clean it.



## 2 Could it ooze out?

If, over time, product could ooze, flow, fall or "juice" out due to agitation, vibration, or gravity, then there is opportunity for improvement on that equipment. Product and/or moisture accumulation can lead to cross contamination and unsafe product.



## 3 Where would I hide to survive?

To answer this question, you must think like a bacterium. If I am microscopic, where can I go on this equipment to not be destroyed by cleaning and sanitation and still have access to water and food?



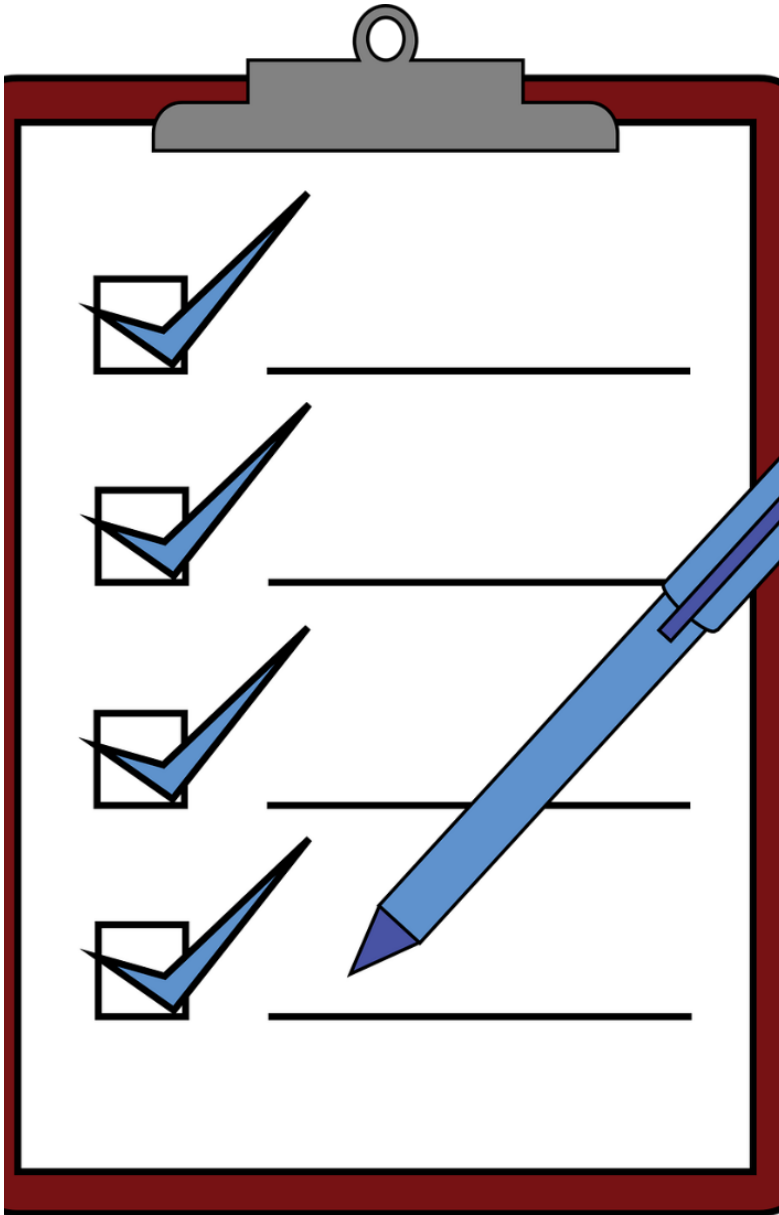


# FROM THE CEILINGS TO THE FLOORS



## FACILITY SANITARY DESIGN ASSESSMENTS

- Separate raw from ready-to-eat
- Must be cleanable to microbiological level
- Made of compatible materials
- Surfaces smooth and accessible
- No niches
- No product or liquid collection
- Hollow areas should be hermetically sealed







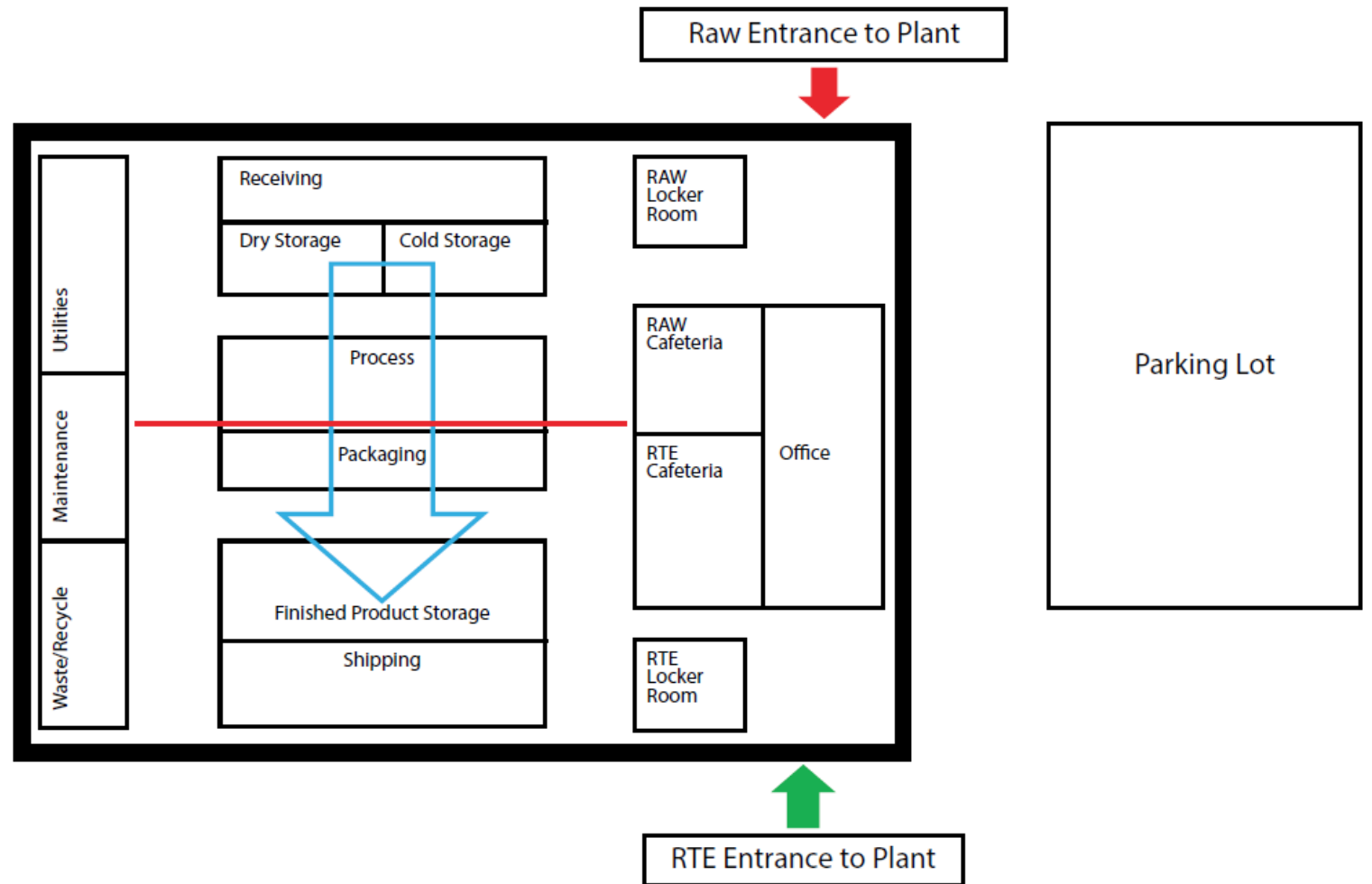
**SEPARATE RAW FROM READY-TO-EAT**







# IDEAL PLANT LAYOUT AND FLOW





**MUST BE CLEANABLE TO MICROBIOLOGICAL LEVEL**







- Equipment is designed to be constructed & maintained in a cleanable condition to prevent the introduction, survival and multiplication of microorganisms (measured post installation).
- Surfaces are clean visually and to touch and pass pre-operation inspections using sight, touch and smell (measured post installation).



**MADE OF COMPATIBLE MATERIALS**



It is important that FCSs are made with materials which are corrosion resistant, non-toxic and non-absorbent and approved.







Plated, painted and coated surfaces are not used for food contact surfaces or for surfaces above the product zone areas.

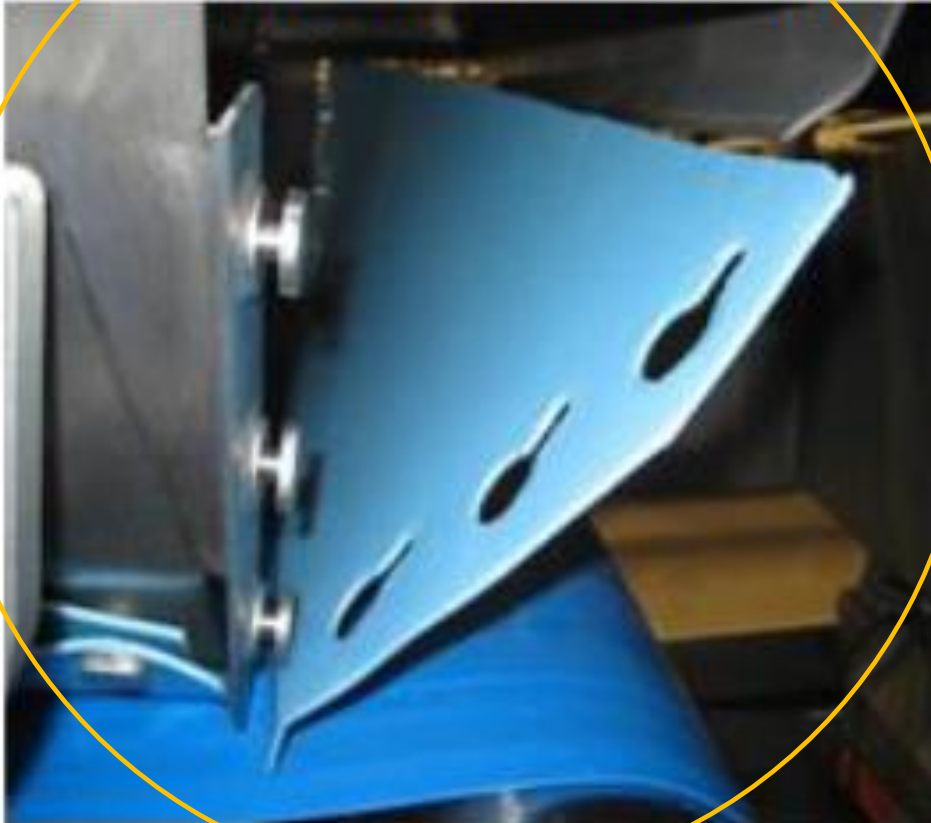


# **SURFACES SMOOTH AND ACCESSIBLE**



# WHICH FIGURE IS A BETTER OPTION?

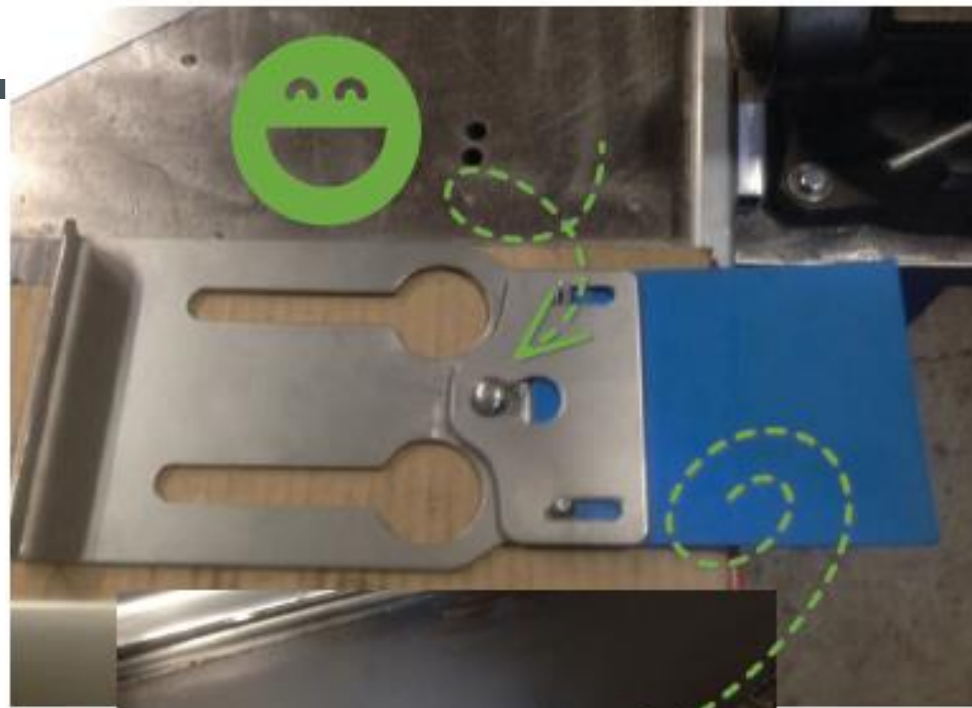
A



B







Product gate with fasteners removed and designed to be easily accessible for cleaning.

## BUNDLED COLLECTION OF WIRES NEED TO ALLOW EASE OF CLEANING



## HINGES

The piano hinge can create a harborage point since each of the pin loops can allow water entry and is also difficult to clean.



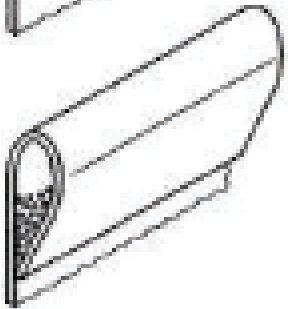
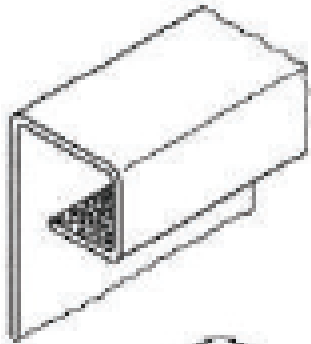




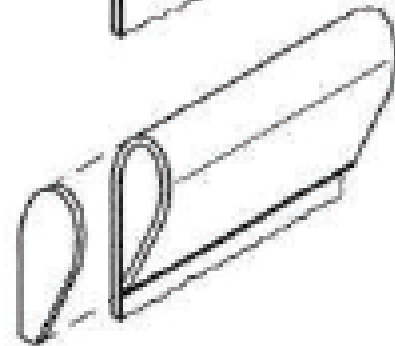
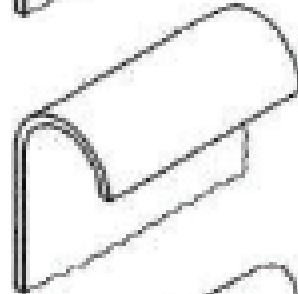
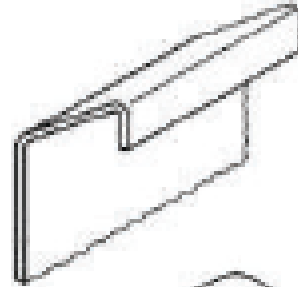


# NO NICHEs



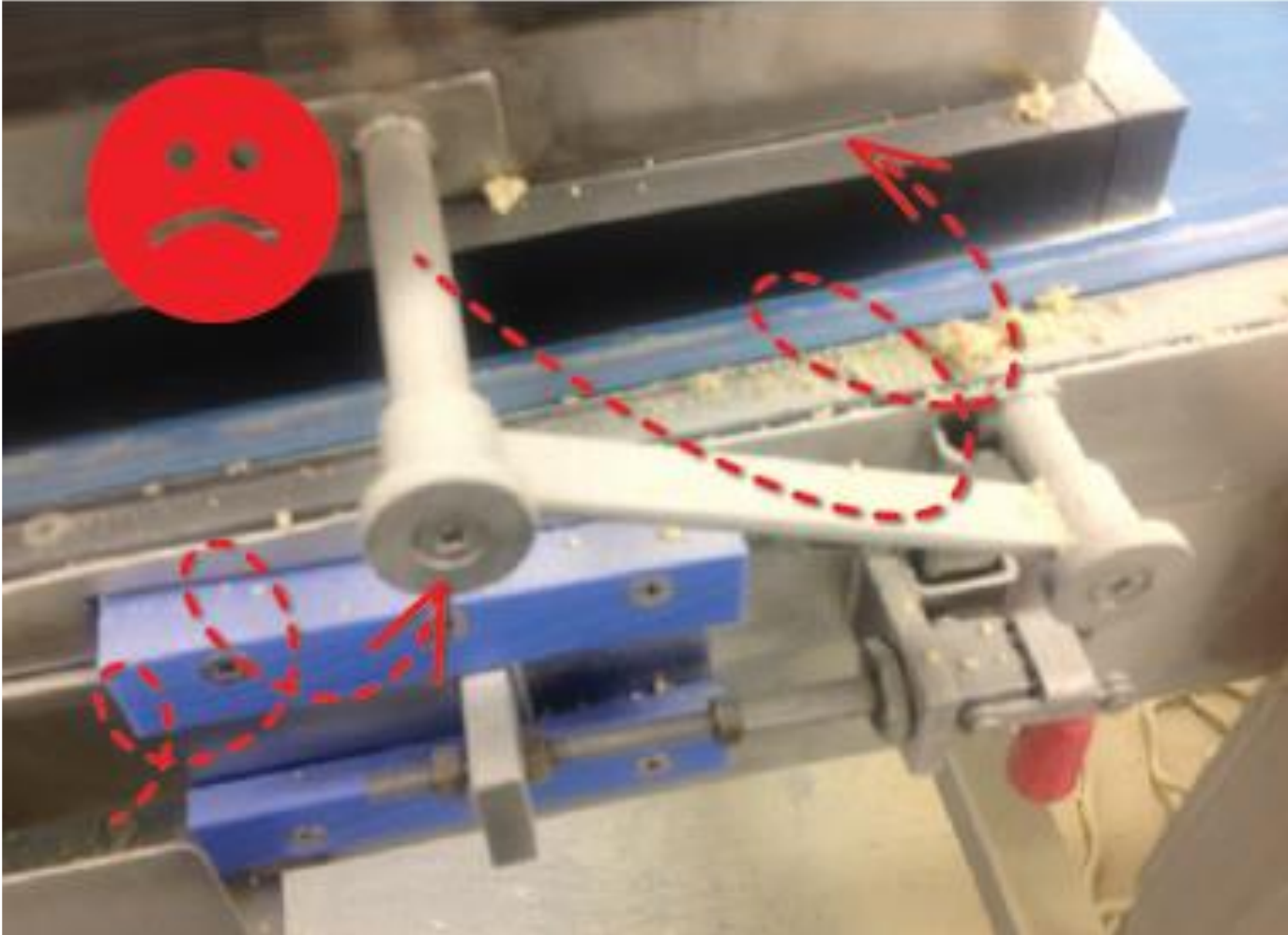


Hygiene risk  
for edge  
finishes



Acceptable  
risk  
alternatives  
for edge  
finishes





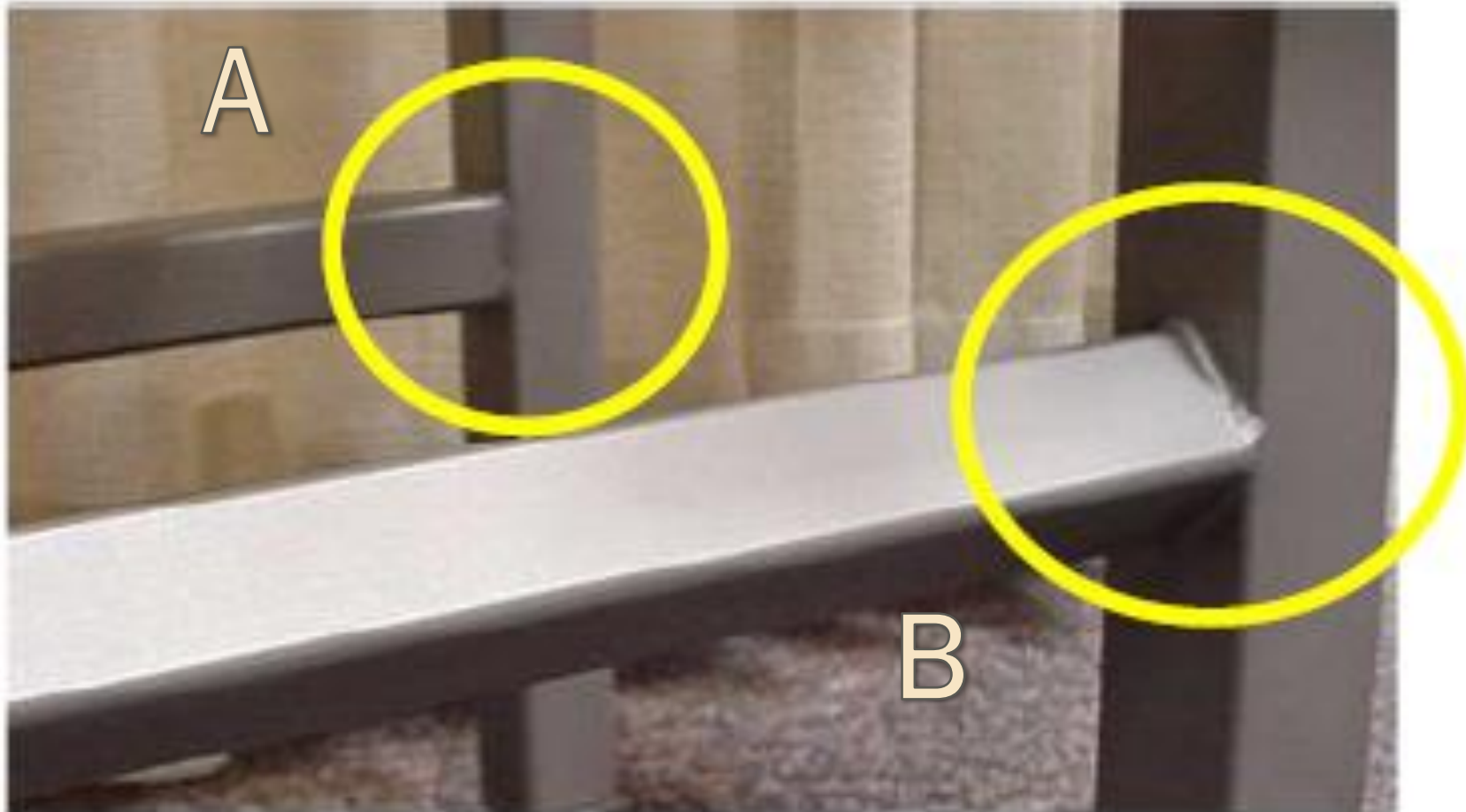
Belt  
assembly  
showing  
recessed  
bolts and  
other  
potential  
niche areas



**NO PRODUCT OR LIQUID COLLECTION**



## WHICH IS A BETTER OPTION?





A



Shows a slope in the condensate drip pan, which helps eliminate water pooling.

B



Moisture must not drip, drain, or drawn into Food Contact areas.



Laurel Dunn and Michelle Danyluk


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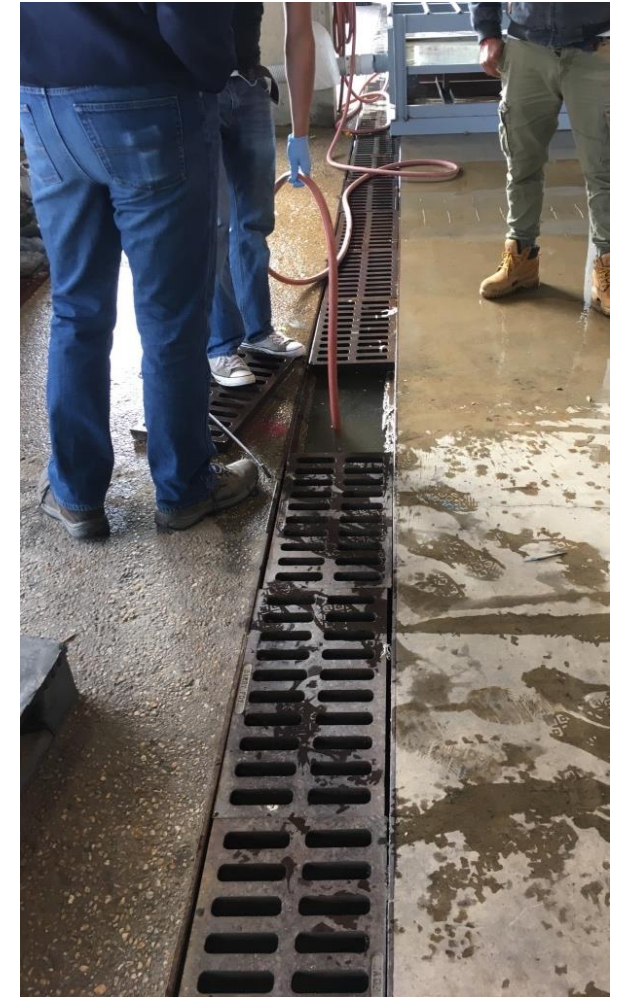
## COLD STORAGE

- Not always built with cleaning/sanitation in mind
- Long periods between cleaning
- Cold, wet environment - *Listeria* friendly
- Storage bins and fork lifts introducing contamination into the environment
- Cooling coils hard to clean
- Air handling system is very effective at moving contamination around facilities

# DRAINS



- Should flow from Washed/RTE  Raw/Pre-washed
- Sloped floors
- Sewer lines should not be above food, contact surfaces, or packaging materials
- Replace trench drains, when possible







**HOLLOW AREAS SHOULD BE HERMETICALLY SEALED**



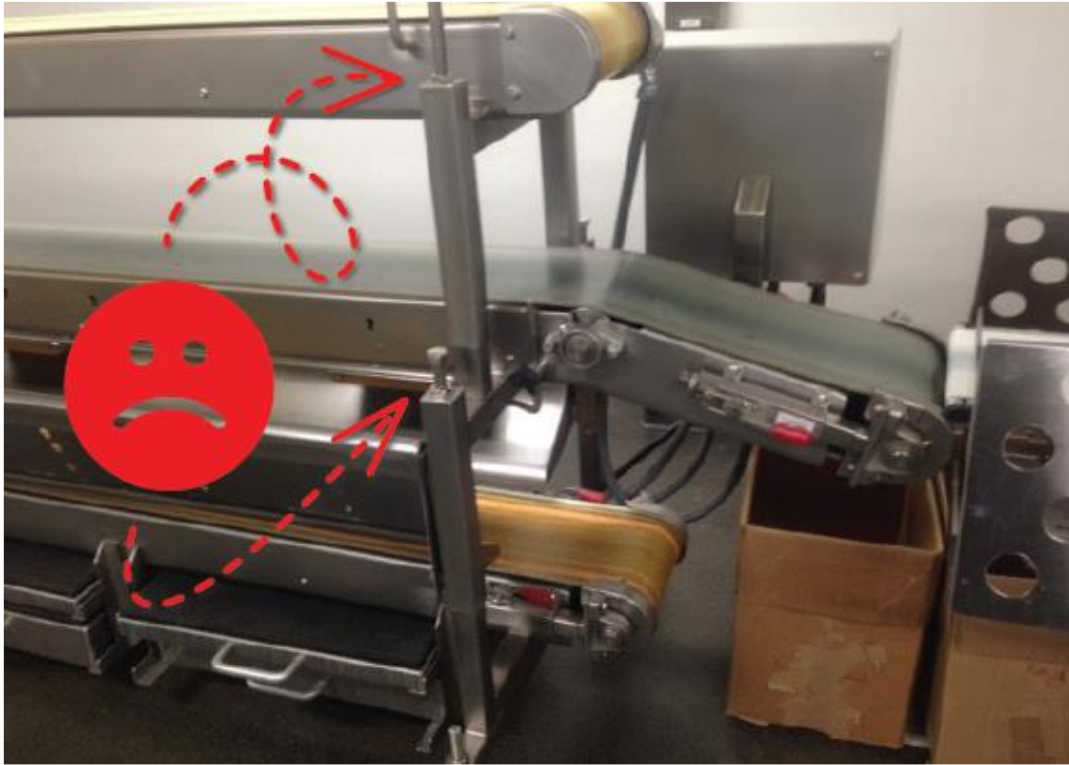
## WHAT IS WRONG WITH THIS WELD?



☺ Hollow areas  
hermetically  
(airtight) sealed

☹ Niches present

☹ Not  
microbiologically  
cleanable



Telescoping legs create hollow cavities – tube in tube construction is difficult to clean and inspect.



Packing table with telescoping legs replaced by seal welded tube legs.





## HOLES

- Drilling holes in equipment should be avoided at all costs. Holes will create harborage areas and area inside holes will be difficult to clean.
- If holes cannot be avoided then:
  - Internal surfaces should be smooth
  - Free from threads
  - Free from rough welds

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# PROACTIVE INTERNAL AUDITING SANITARY DESIGN PROGRAMS

- Assessment of Facility Sanitary Design:
  - Structure
  - Equipment
  - Sanitation
  - **Maintenance**
  - **Employee Practices**

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# PROACTIVE INTERNAL AUDITING SANITARY DESIGN PROGRAMS

- Maintenance SOPs?
  - What happens when repair occurs during production?
  - Are there broken pieces?
  - Where did they go?
  - Are all tools recovered?
  - Is there a sanitation step prior to restarting?
  - What if product is on the line?
  - RTE vs Raw procedures?



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# PROACTIVE INTERNAL AUDITING SANITARY DESIGN PROGRAMS

- Employee Practices
  - Production staff
  - Non- Production staff
  - Management support
  - Visitors – routine/occasional
- Are there SOPs in place and monitored for all?







## GOALS FOR ASSESSMENTS OF SANITARY DESIGN

1. Compliance with FSMA & 3<sup>rd</sup> Party Criteria
2. Sanitation Planning
3. Capitol Planning
4. Improving Equipment Design
5. Safe Food for Hungry Tummies!



# SANITARY DESIGN RESOURCES

- North American Meat Institute (NAMI) Sanitary Design
- Sanitary Equipment Design Principles Checklist and Glossary
- Food NW Sanitary Design Made Simple
- Hygienic Equipment Design Checklist – AFFI
- Hygienic Design – Commercial Food Sanitation



JANUARY 2014  
EDITION

## Sanitary Equipment Design Principles CHECKLIST & GLOSSARY

FOUNDATION FOR  
MEAT & POULTRY  
RESEARCH & EDUCATION

PRINCIPLE #1 - CLEANABLE TO A MICROBIOLOGICAL LEVEL					Comments	Points	Points Available
Criteria	S	M	U	N/A			
Equipment is designed to be constructed & maintained in a cleanable condition to prevent the introduction, survival and multiplication of microorganisms (measured post installation).						0	20
All surfaces are cleanable as measured by <1 Colony Forming Unit (CFU) per 25 square centimeters, <1 CFU per 10 ml when the item is rinsed, acceptable Relative Light Units (RLU) (device specific) when measured by residual ATP, and/or negative for residual protein or carbohydrate when using swabs to detect residual protein or carbohydrate						0	20
All surfaces are accessible for mechanical action during cleaning & treatment to prevent biofilms formation (measured post installation).						0	20
When requested, data are available to demonstrate that soiled equipment is cleanable (as defined above) by an individual using the cleaning protocol provided by the equipment supplier (measured post installation).						0	20
Surfaces are clean visually and to touch and pass pre-operation inspections using sight, touch and smell (measured post installation).						0	20
A Hazard Analysis and Critical Control Points (HACCP) based product risk assessment was completed during the design phase to understand risks associated with the product						0	20

### Hygienic Equipment Design Checklist

Review Date:

Review Location:

Review Description:

Reviewed By:

S = Satisfactory  
M = Marginal  
U = Unsatisfactory  
N/A = Not Applicable  
Please note: the score will automatically calculate on the summary page.



# VIRGINIA NG

SEAFOOD PRODUCTS ASSOCIATION

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# Q & A

