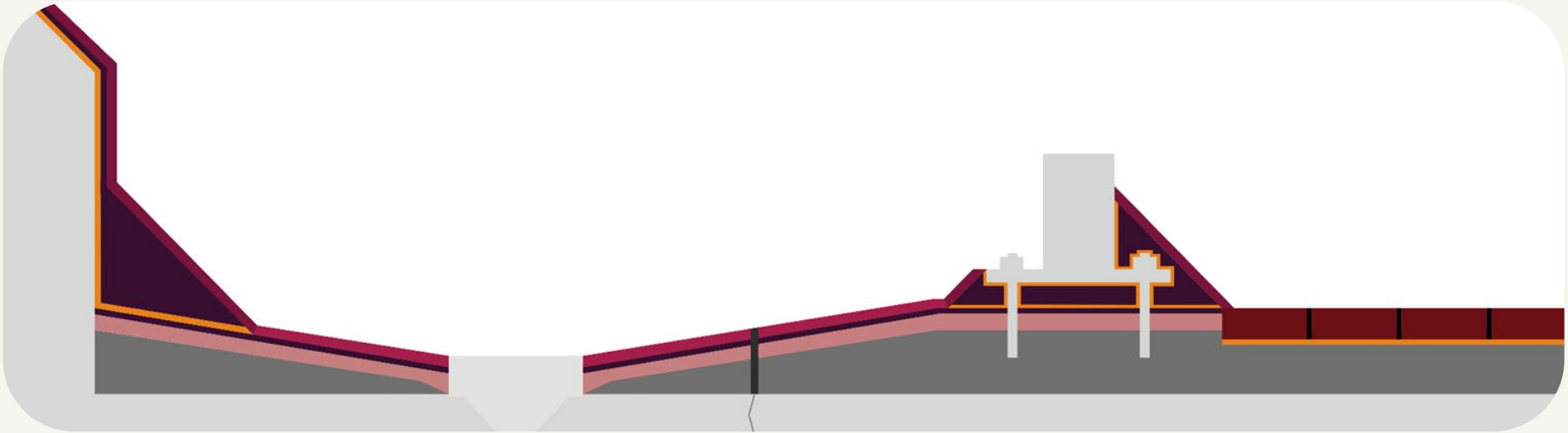


Sanitary Design - Industrial Coating Systems

Presenter: Todd Kwasny

INDUE

Products that work. Experience that counts.

April 1, 2026

Intro

Who's Indue?

Indue Sales &Services is a premium manufacturer & installer of industrial coating systems. Established in 1980, we do business with over 95% of the top 25 food and beverage companies in the United States.

Sanitary Design

Starting from the

FLOOR UP

- Layout and foundation are often the first steps in planning
- The floor is typically the first point of contact
- People, Products & Equipment all use the floor for travel
- The design of the floor directly impacts sanitation process and its efficacy

Agenda

Planning for Success

Material Selection

Maintenance and Inspection

Contractor Considerations

Wrap Up and Questions

Planning for Success:

Incorporating sanitary design principles into your flooring plans

Items to consider in the design phase:

- Drainage
- Eliminating Harborages
- Cleanability
- Zoning and Striping
- Pre-Project Checklist

Drainage

Bacteria requires 3 things to grow:

1. Food
2. Suitable Environment (Temp/PH)
3. Water

Proper drainage can deny them one of these.

Bacteria requires 3 things to grow:

1. Food
2. Suitable Environment (Temp/PH)
3. Water

Proper drainage can deny them one of these.

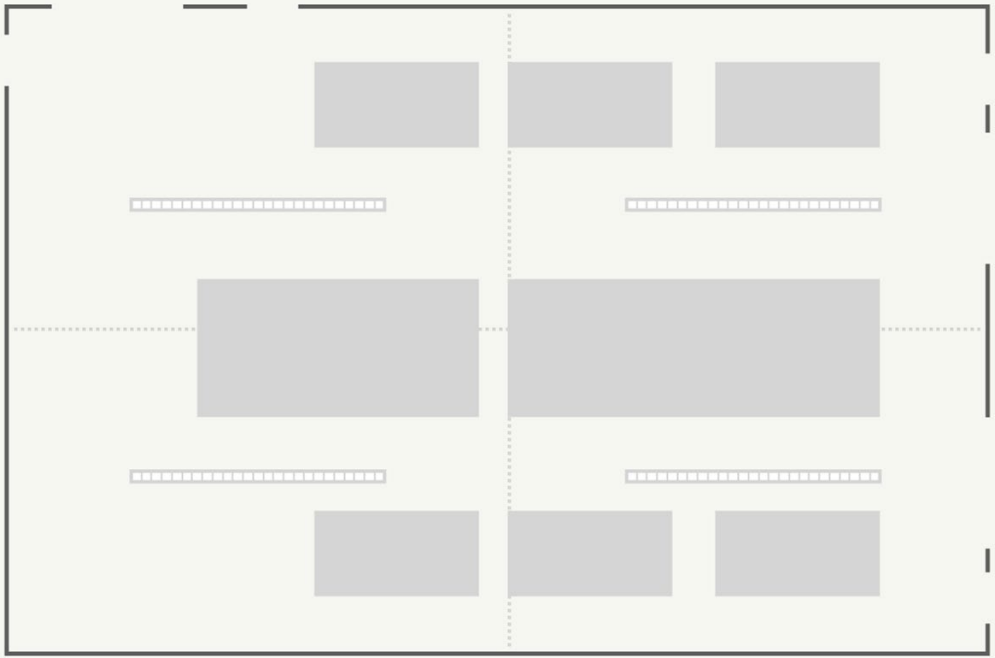
Jensen Farms Listeria Outbreak

- 33 deaths
- 147 confirmed cases

FDA Report

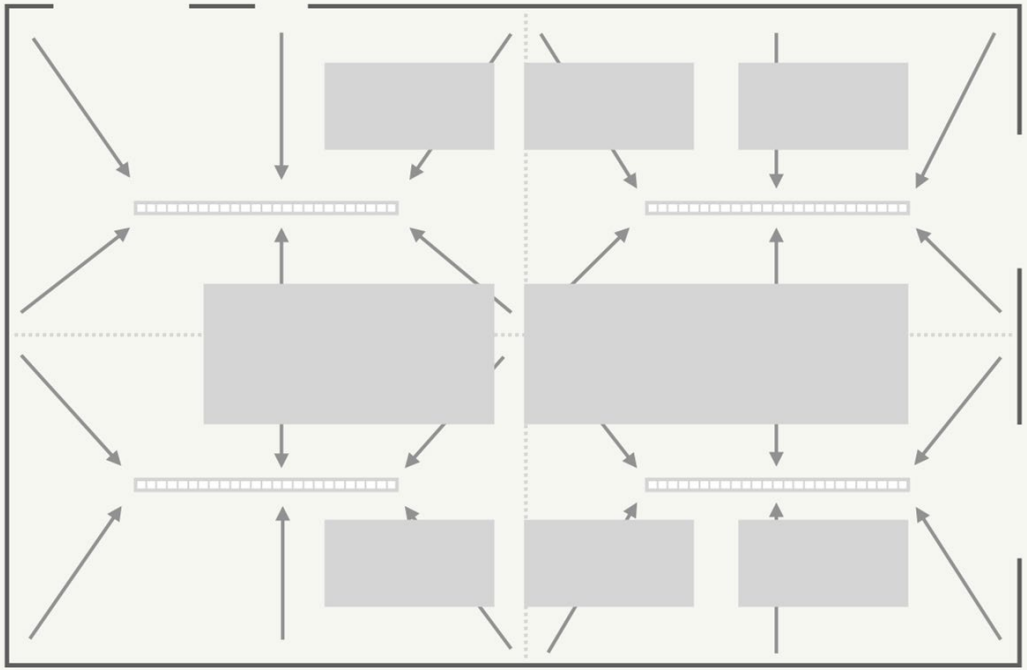
- Water contaminated with listeria was pooling on the floor of packaging and processing areas
- Floor was not easily cleanable
- Trench drain was not accessible for easy sanitation
- Equipment design was not easy to clean and sanitize
- Employees tracked listeria contaminated water from pooled areas to other parts of facility

Drain Placement



- Frequency based on water usage volume in given area
- Not placed directly beneath equipment or in a loading area
- Spaced at even intervals
- Location that is easy to clean, service, and inspect

Sloping vs Pooling



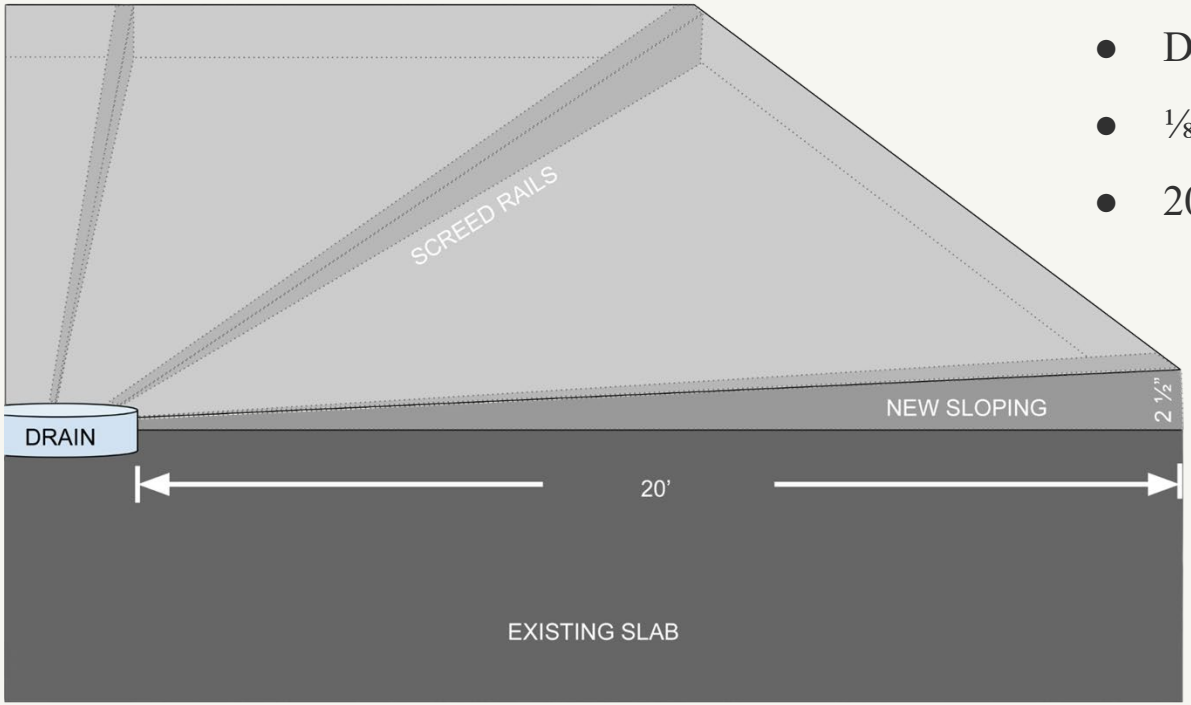
Sloping

- Floors should be sloped at 1-2% depending on type of area
- This is typically a drop of ⅛”-¼” per foot

Pooling

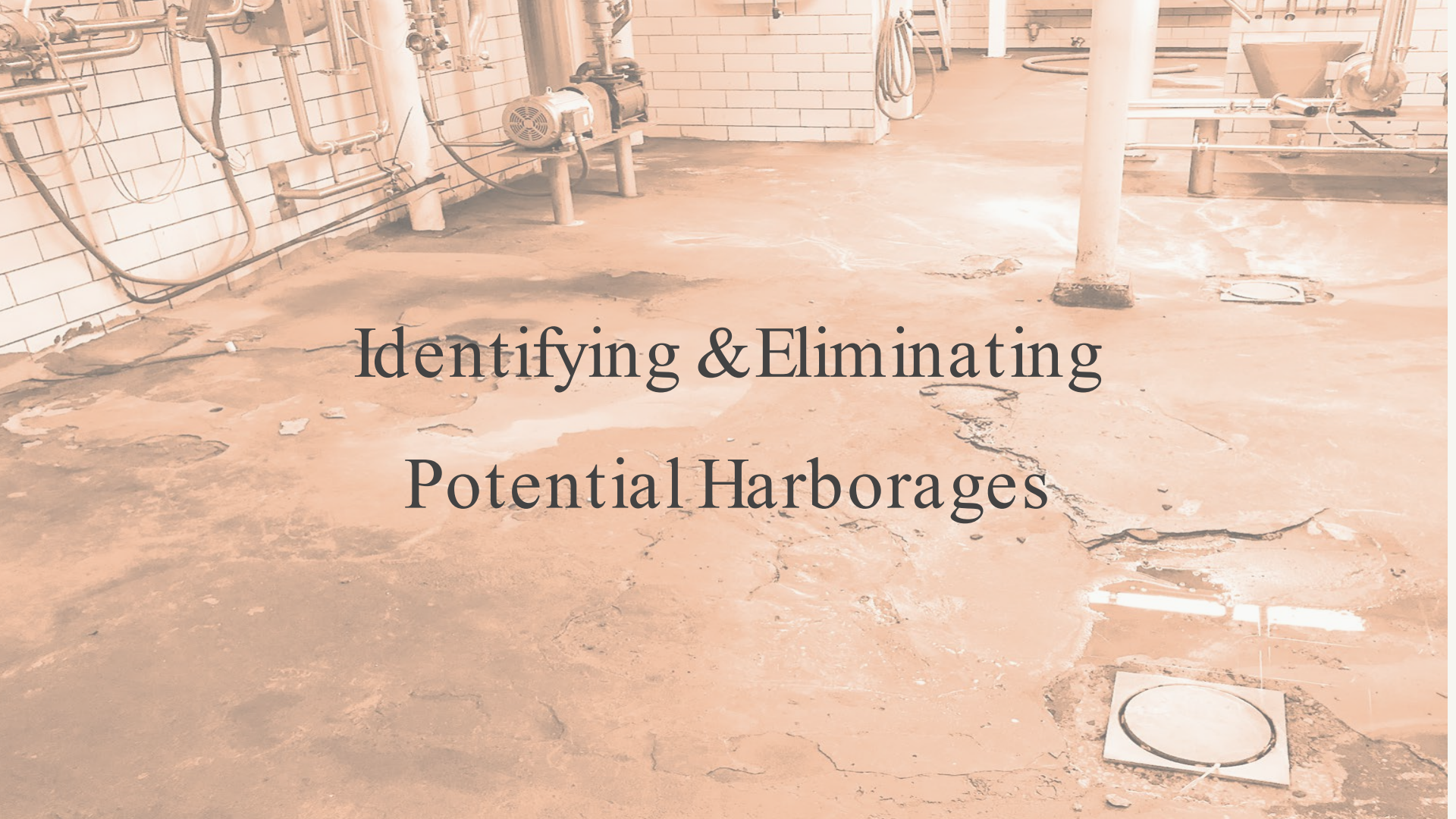
- Proper slope eliminates pooling
- Pooling provides ideal environment for bacterial growth

Sloping vs Pooling



Standard Sloping Rate

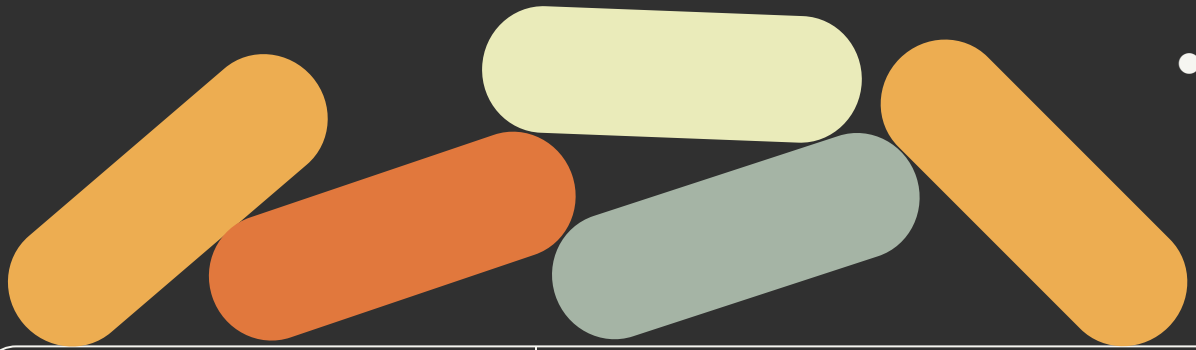
- Design water out of the environment
- ⅛" per lineal foot
- 20' = 2 ½" rise from drain



Identifying & Eliminating Potential Harborages

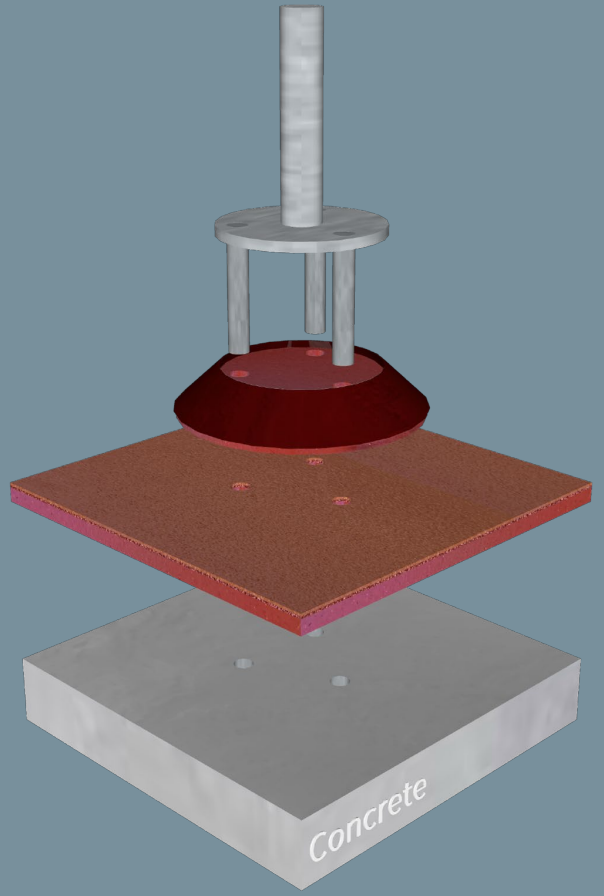
Characteristics of Harborage Points

- Difficult to clean
- Contain cracks, crevices, legs, uneven or irregular surfaces
- Trap moisture and/or organic material
- Are difficult to see or inspect

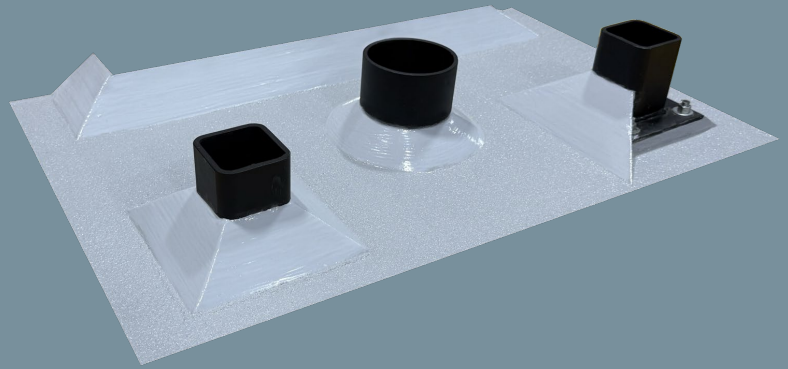


Harborages: Machine Legs

Design machine legs in a way that their surfaces are cleanable or coved so that they don't become a harborage



Harborages: Machine Legs



Design machine legs in a way that their surfaces are cleanable or coved so that they don't become a harborage.

Harborages: Floor/Wall Juncture

Utilize perimeter cove to make an easily cleanable junction between the floor and the wall.

FDA Food Code Chapter 6-201.13 Subpart B regarding Floors, Walls and Ceilings states that any area using water flush cleaning methods must have the floor to wall juncture coved and sealed.

Harborages: Cracks/Joints

Over fill joint, shave flush

Cracks and joints should be filled. If slab movement caused the crack, it needs a semi-flexible joint filler that will allow for movement.

Cleanability

Make It Easy!

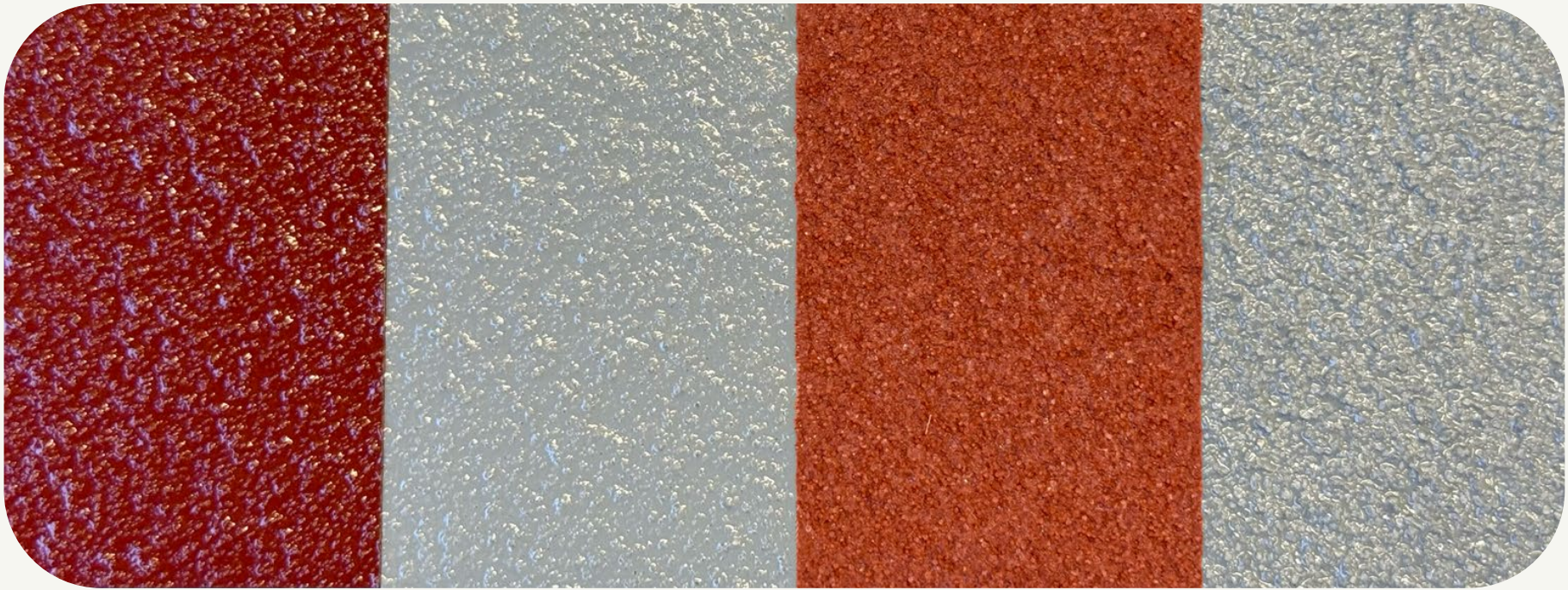
Clearance & Accessibility

Allow space for the prescribed tools and procedures to reach all areas for sanitation and maintenance.

Methods and Tools

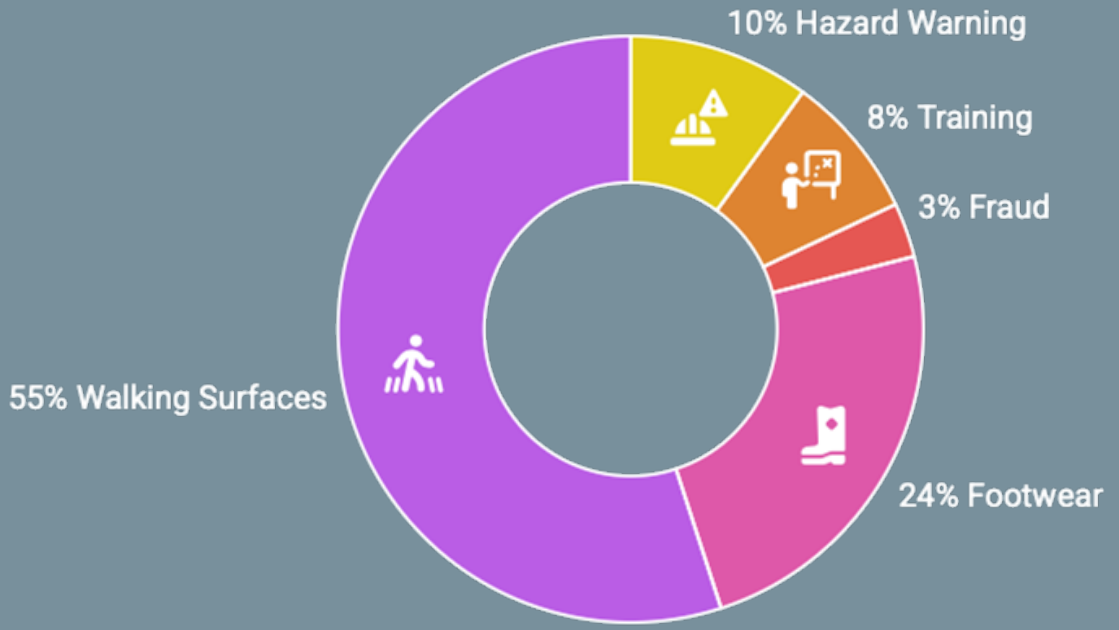
Choose the right methods and tools to clean the area thoroughly and efficiently. The process and the design should take each other into account.

Surface Profile: Safety vs Sanitation



Causes of Slips, Trips and Falls

OSHA recommends minimum 0.5 SCOF



NFSI
NATIONAL FLOOR SAFETY INSTITUTE

Safety

vs

Sanitation

- More aggressive profile
- Less chance of slips and falls
- More important in areas that are wet, extreme slope/stairs, slip hazards

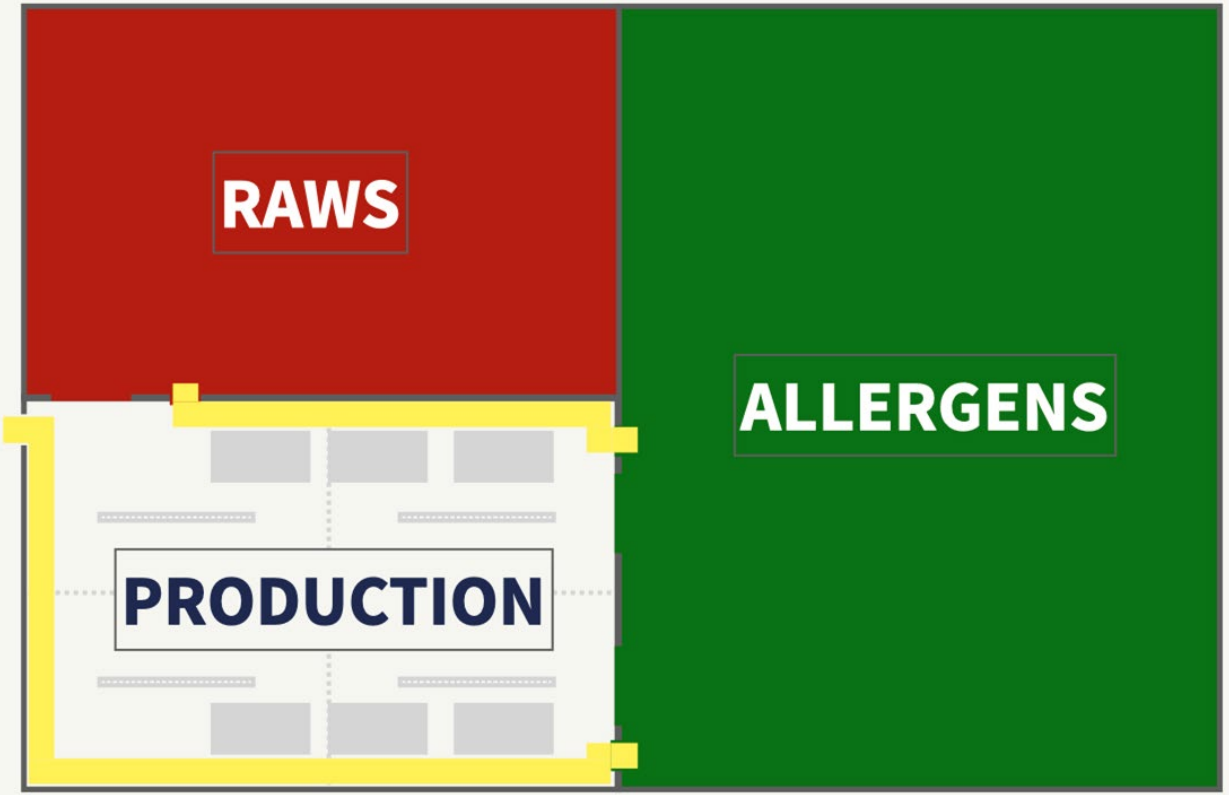
- Less aggressive = easier to clean
- Smoother profile traps less debris
- Can be cleaned with less aggressive methods

Finding a Surface Profile Solution

- Different areas have different needs
- The right surface profile balances employee safety with sanitation requirements
- Coefficient of friction/slip resistance on surfaces is dynamic and will decrease over time

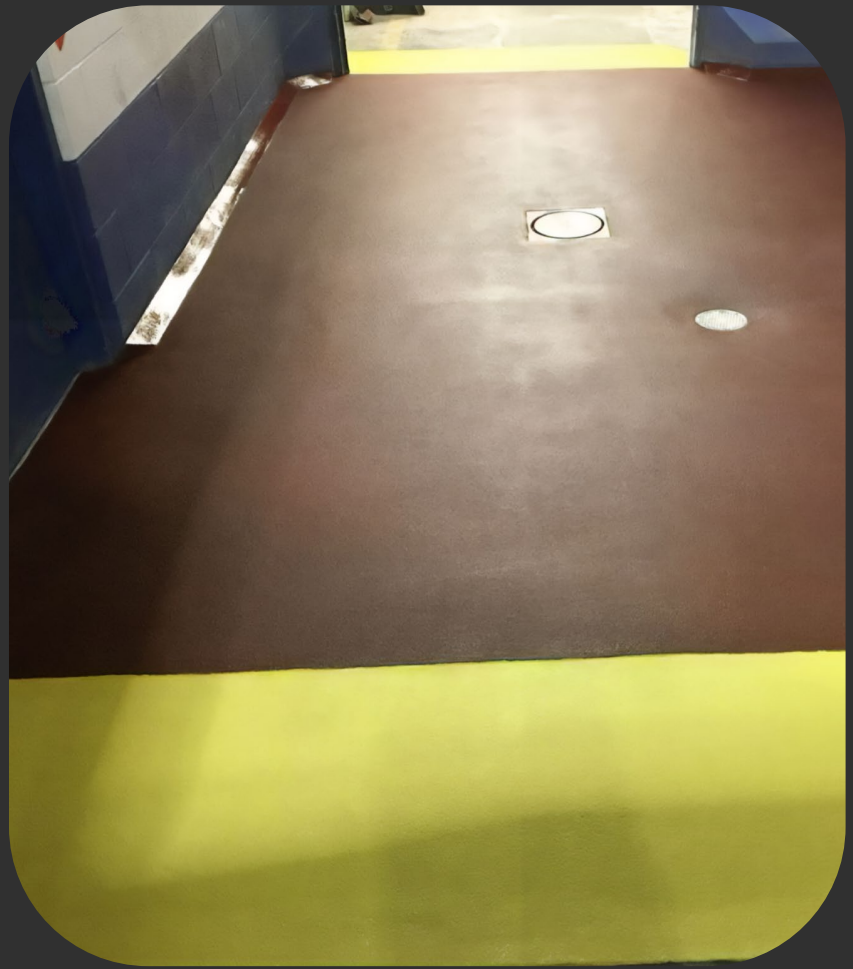
	Base Coat + Aggregate Used	Top Coat Treatment	Tribometer Readings	Recommended For
1	MT with S grade	2 mid coats: TTC top coat	Wet: **.38** Dry: **.52**	Packaging Warehouse
2	MT with S grade	1 mid coat: UTC top coat	Wet: **.53** Dry: **.64**	Packaging Warehouse
3	MT with A grade	1 mid coat: UTC top coat	Wet: **.78** Dry: **.82**	Packaging Warehouse
4	MT with S grade	UTC top coat	Wet: **1.18** Dry: **1.21**	Wet Wash Production
5	MT with A grade	UTC top coat	Wet: **1.24** Dry: **1.25**	Wet Wash Production

Traffic Planning, Zoning and Striping


RAWS
ALLERGENS
PRODUCTION

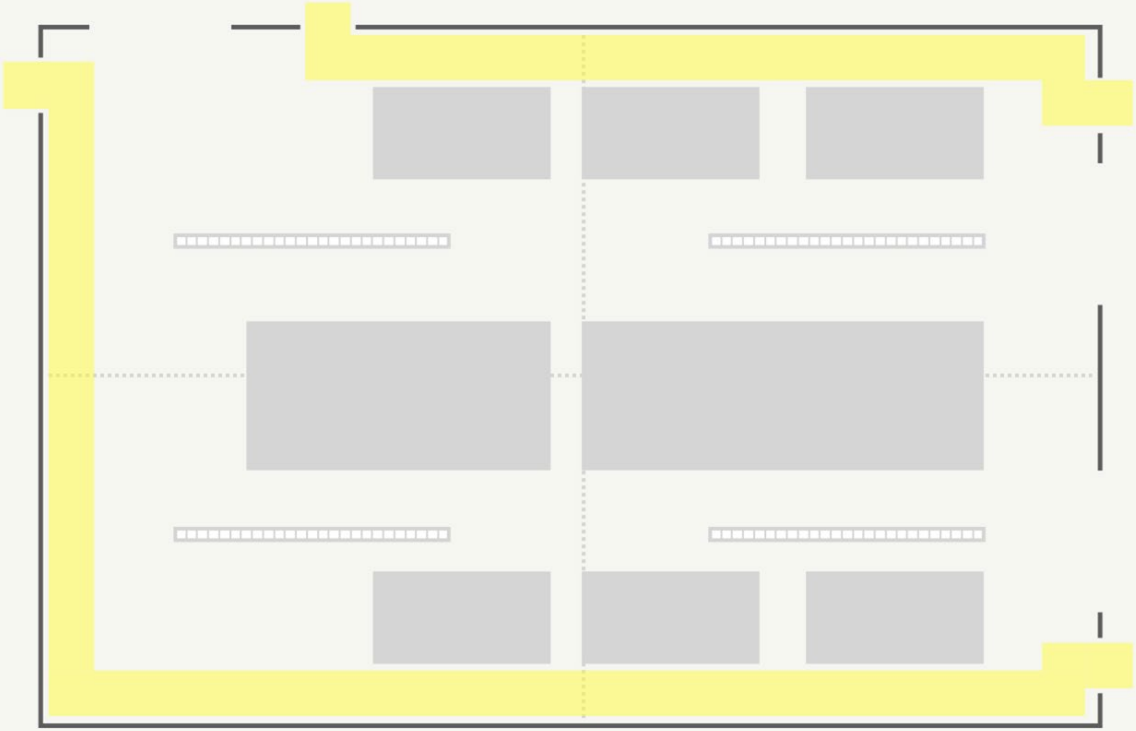
Traffic Planning

- Traffic should move from low risk areas into high risk areas to avoid cross contamination
- Physical barriers should separate low risk and high risk areas
- Buffers and sanitation measures should be in place when leaving high risk areas



Striping

- Designated traffic pattern
- Areas of caution
- Material placement
- Rodent Striping



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Pre-Project Considerations

Sanitary Design

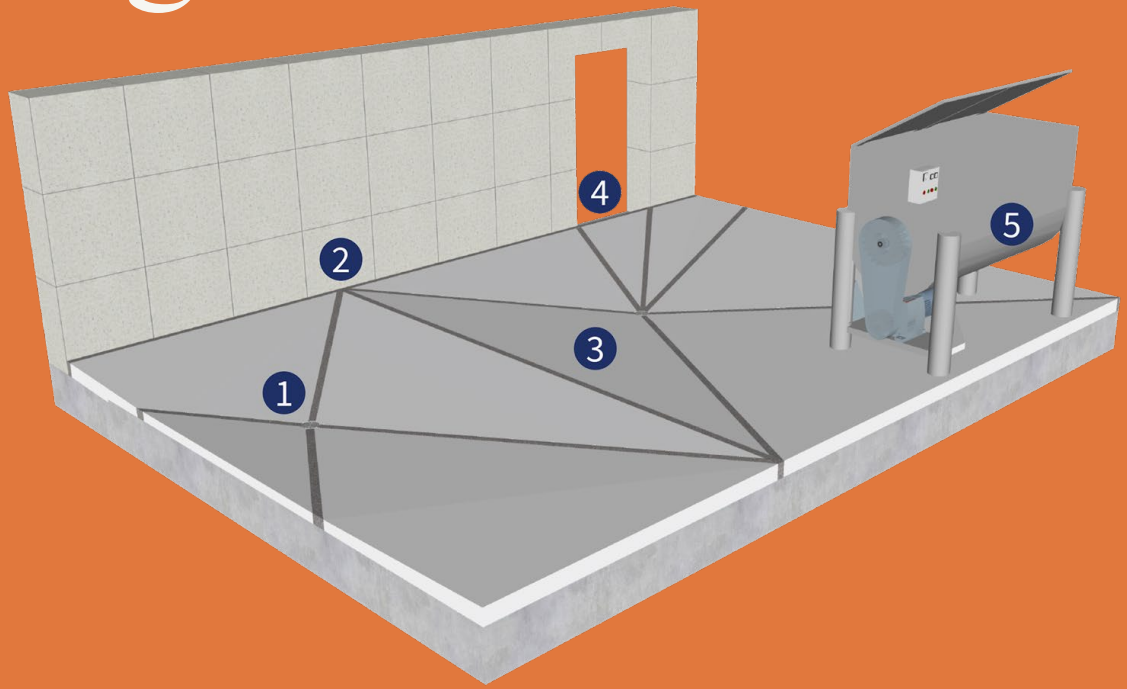
1. DRAINS
   Set at proper height relative to the surrounding floor

2. HIGH POINTS
   Strategically placed between drains, walls, doorways and equipment

3. DRAINAGE ZONES
   Designed to ensure most efficient drainage and eliminate pooling

4. TERMINATION POINTS
   Doorways, adjacent areas and drains affected during planning process

5. MACHINES/OBSTRUCTIONS
   Ideal to remove or raise, make a plan on how to coat under / around and around machine legs



Mitigating Cross Contamination

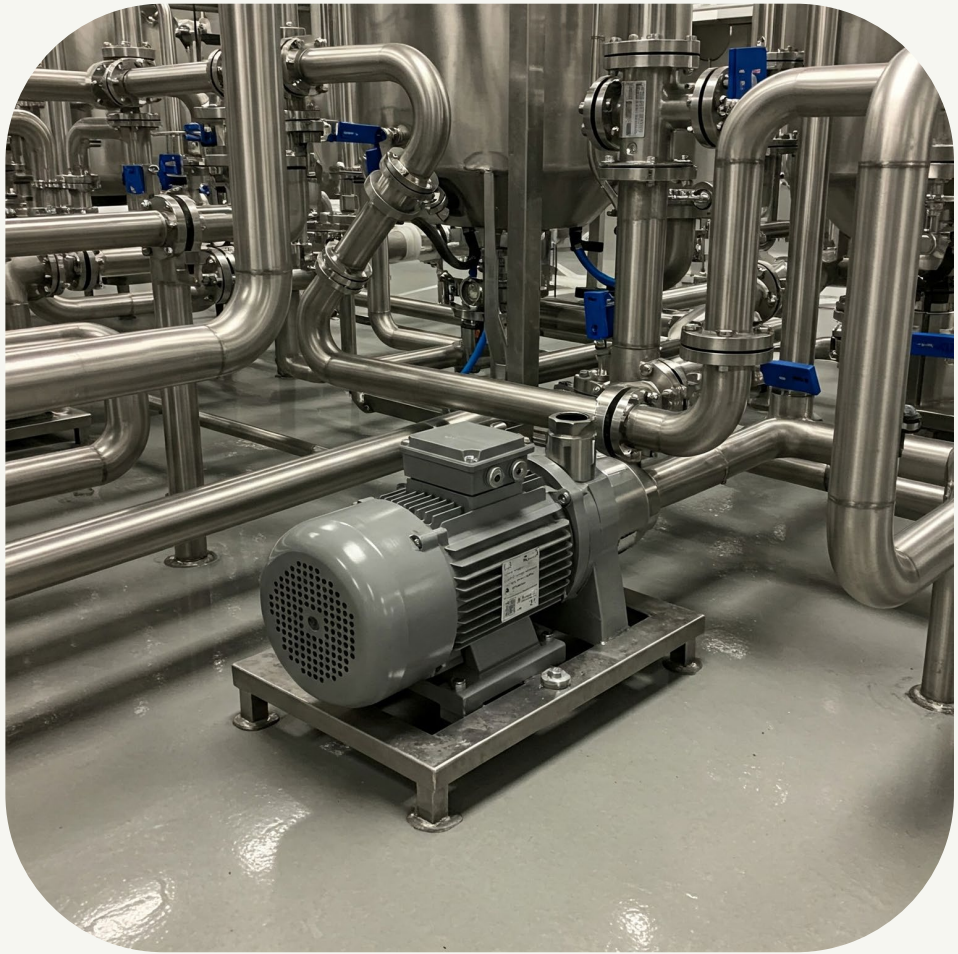
- Project area containment
- Designated traffic routes
- Transit plan for people, equipment, material, and debris

Preparing the Project Area

Remove equipment where possible to minimize termination and transition points

Maximize access and clearance - if an area can't be reached, it can't be properly prepped and coated

Create a conducive environment for the coating material installation



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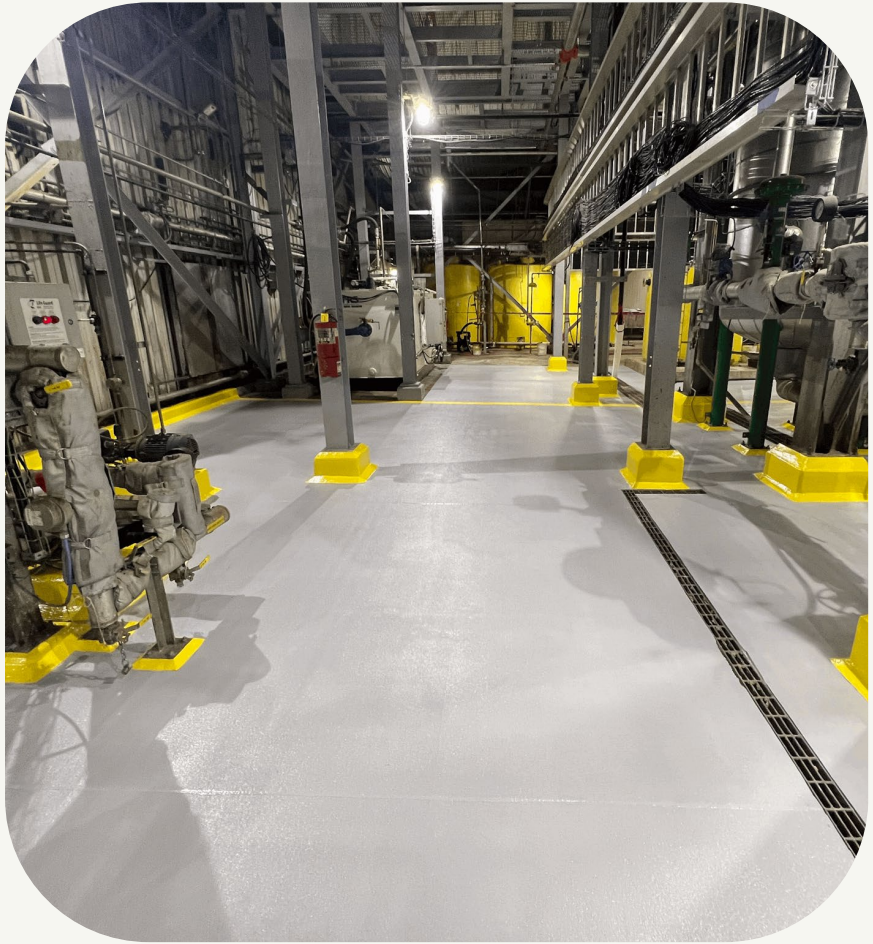
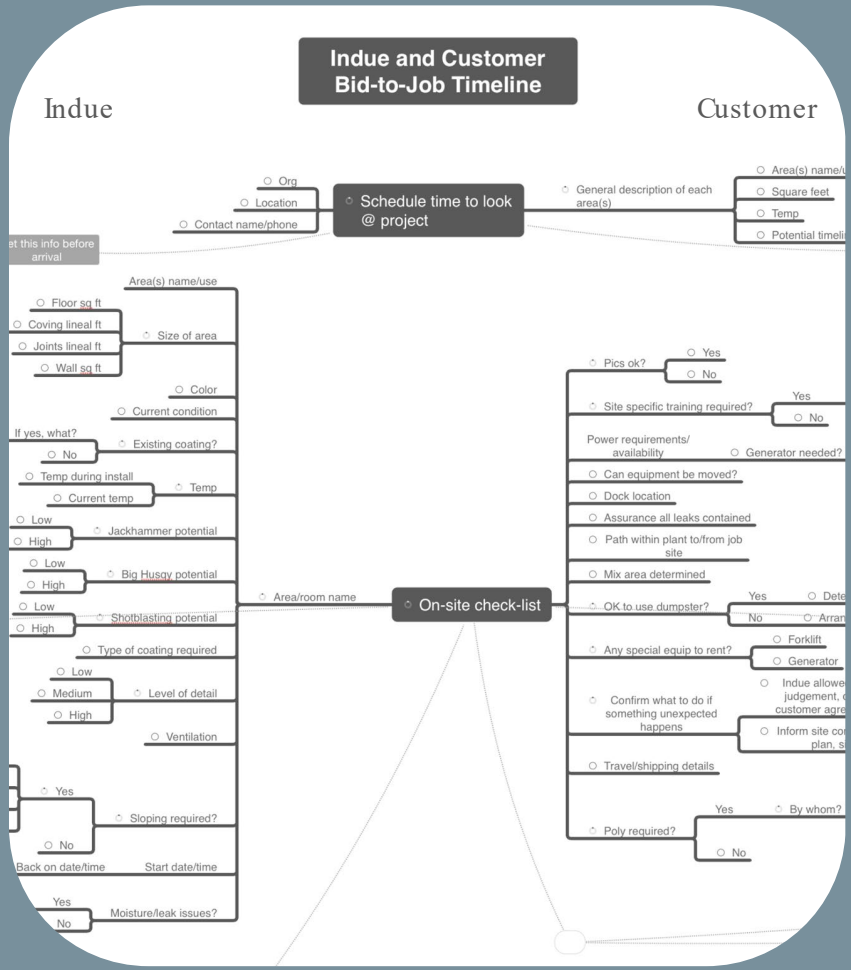


Create a conducive environment for the coating material installation

Communication

- Communication is vital to project success
- Facility personnel and contractors need to be on the same page
- Both parties need to articulate their requirements *prior* to the start of the project and collaborate to ensure a successful outcome




MATERIAL SELECTION

FDA Food Code 6-101.11

FDA Floor Requirements

Durable

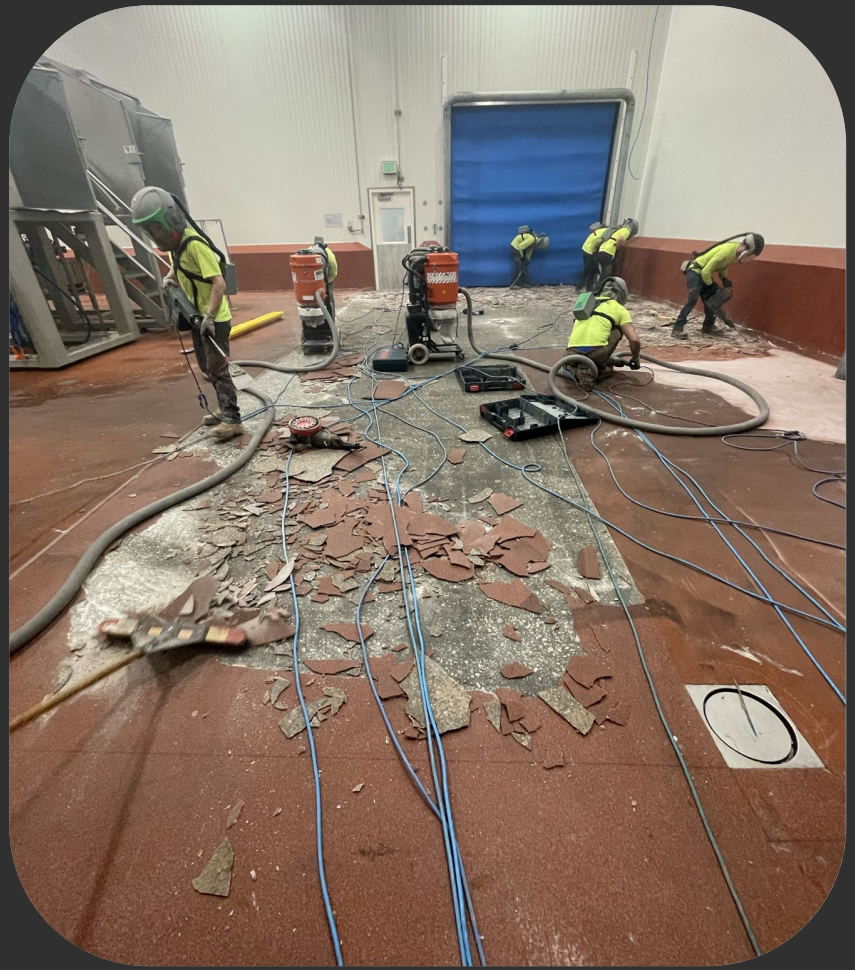
Cleanable

Non-absorbent

Identifying Material Requirements

Evaluating chemical exposure &chemical resistance:

- Sanitation SOP
- Chemical storage
- Product/ingredient spills and exposure



Identifying Material Requirements

Physical wear and surface profile

- Traffic type
- Traffic volume
- Cleaning methods
- Type of work being performed

Identifying Material Requirements

Temperature and Thermal Shock

- Main cause of failure
- Coating and substrate rapidly expand or contract at different rates
- Extreme temps may fall outside recommended service or installation range

Identifying Material Requirements

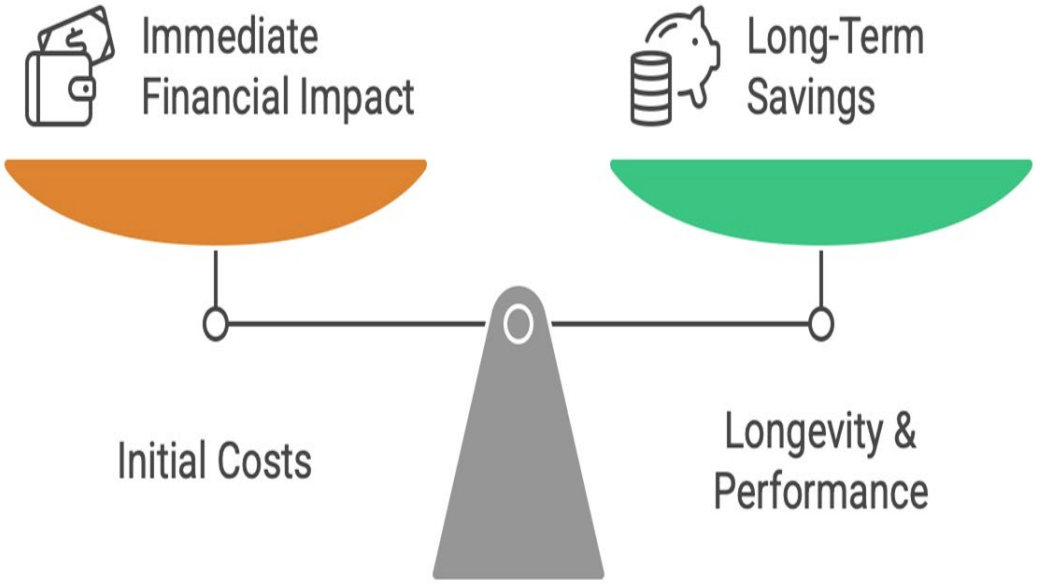
Easy to inspect, repair, and maintain

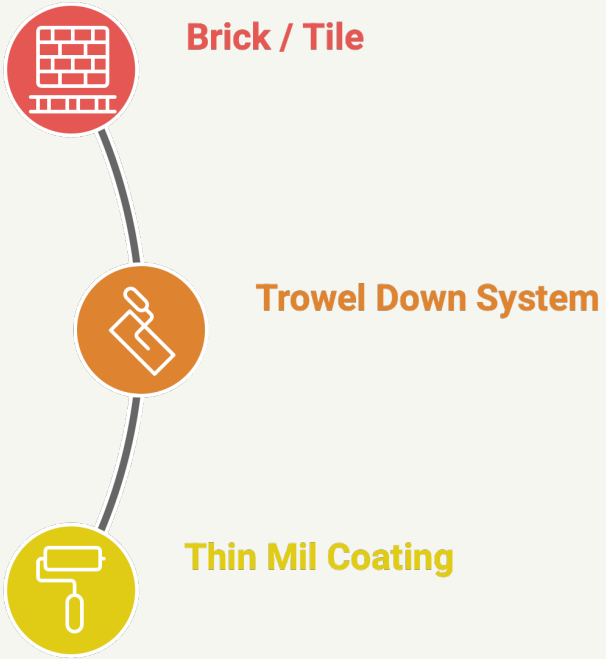
- Easy to see cracks, chips, pooling
- Repairs should be able to be conducted with minimal downtime

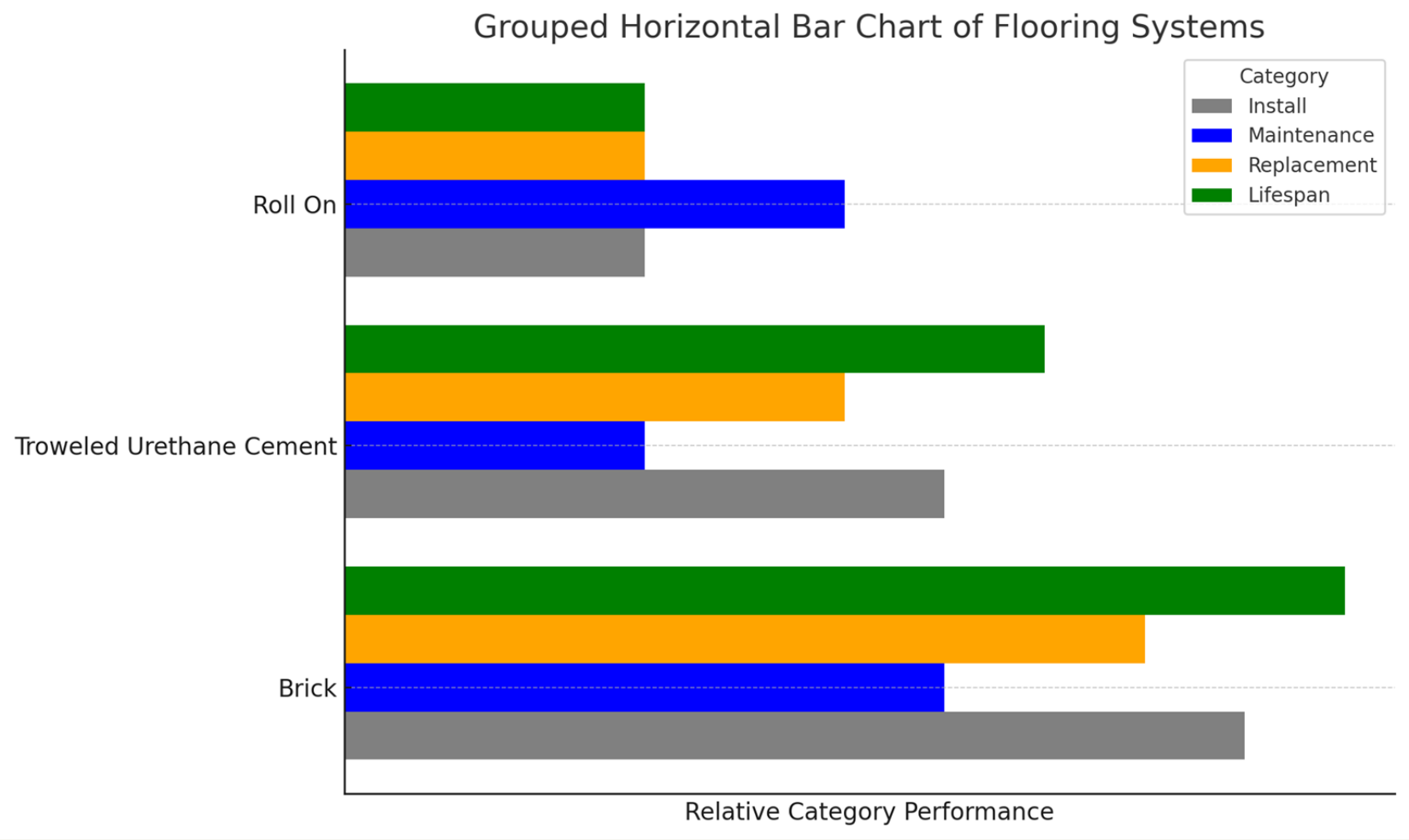
Identifying Material Requirements

Evaluating Costs & Downtime

- How much downtime is required/what will that cost
- Initial cost vs life cycle cost
- Life cycle vs replacement cost


Immediate
Financial Impact
Long-Term
Savings
Initial Costs
Longevity &
Performance
Evaluate initial costs against long-term benefits.


Brick / Tile
Trowel Down System
Thin Mil Coating


Grouped Horizontal Bar Chart of Flooring Systems
Category
Install
Maintenance
Replacement
Lifespan
Roll On
Troweled Urethane Cement
Brick
Relative Category Performance

Types of Flooring Materials

Resinous Flooring

Polymer based coating systems with a seamless finish

- Urethane
- Epoxy
- Polyaspartics/Polyurea
- MMA
- Vinyl Ester
- Urethane Cement

Tile Systems

Tile systems that are individual tiles placed onto an adhesive or setting bed and grouted into place

- Dairy Brick
- Acid Brick
- Vitrified Tile
- Epoxy Grout

Tile Systems

Pros

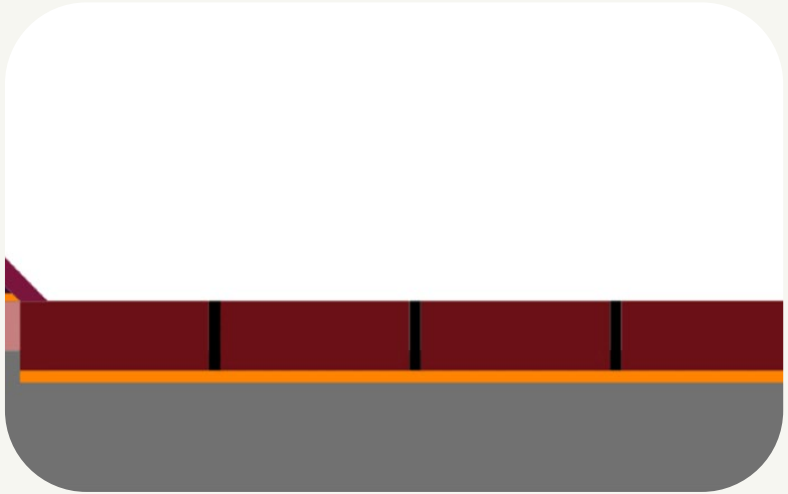
- Tiles themselves have a long service life
- Very resistant to mechanical wear, abrasion, impacts, heat, chemicals
- Cleanable

Cons

- Grout is less durable than tiles, requires regular inspection and maintenance
- Install/repair is costly and time intensive
- Mode of failure from the inside out
- Limited color and surface profile options

Ideal Uses

- Hallways/high traffic areas
- Areas with heavy forklift/hand truck traffic
- Dry areas such as packaging, storage
- Open areas that are easy to inspect



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Ideal Uses

- Hallways/high traffic areas
- Areas with heavy forklift/hand truck traffic
- Dry areas such as packaging, storage
- Open areas that are easy to inspect

Resinous Systems

Pros

- Quick installation/less costly than tile
- Seamless surface
- Easy to inspect and repair
- Customizable color and surface profile
- Variety of chemistries based on area needs

Cons

- Less resistant to mechanical wear than tile
- Varying degrees of durability based on product and environment
- Typically shorter life cycle than well-maintained tile

Ideal Uses

- Wet areas
- Areas difficult to inspect and repair
- Short downtime windows
- Areas that require customized color and profile

Cons

- Less resistant to mechanical wear than tile
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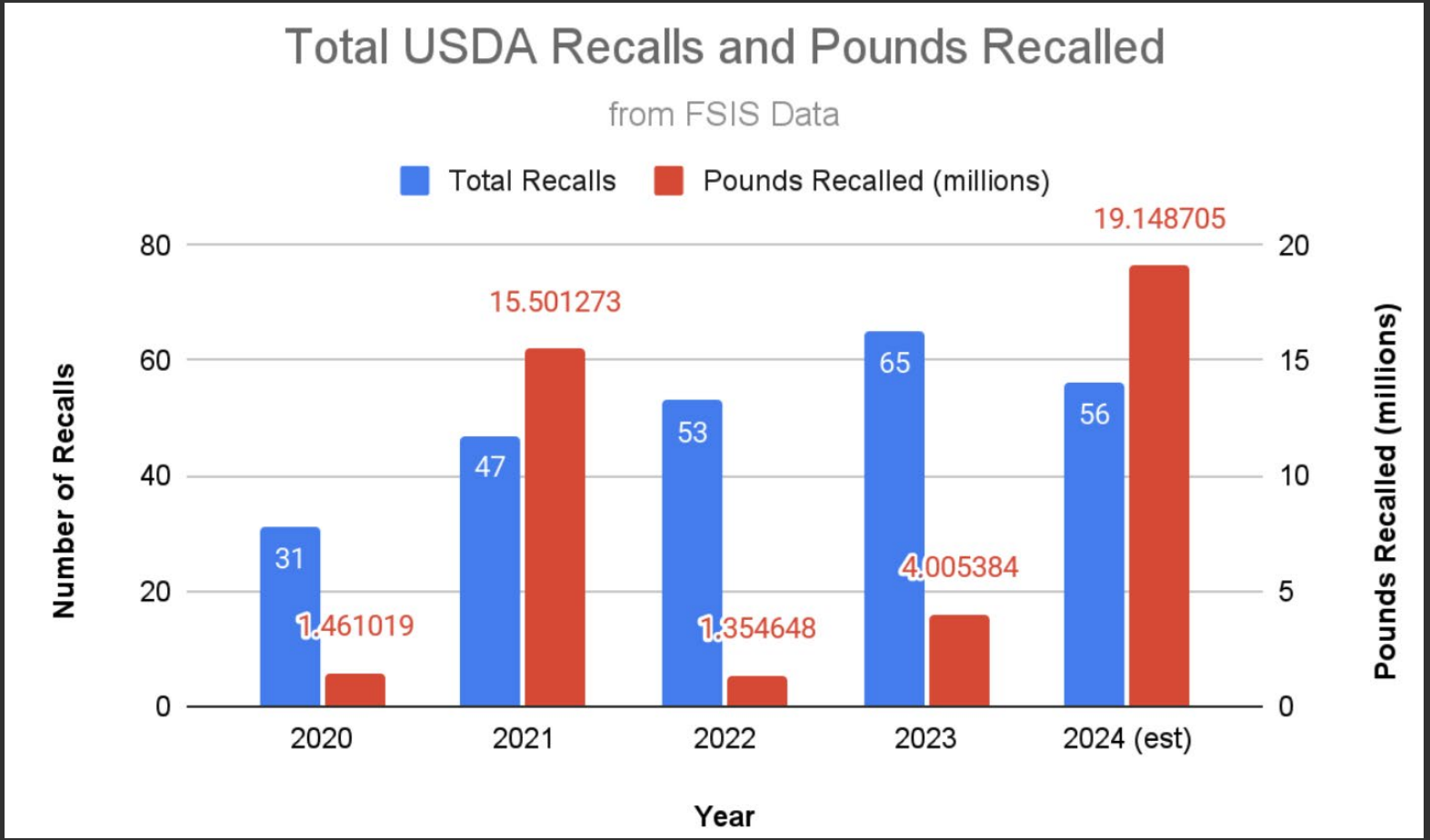
Ideal Uses

- Wet areas
- Areas difficult to inspect and repair
- Short downtime windows
- Areas that require customized color and profile

Urethane Cement

- Excellent thermal cycling properties
- Very good chemical resistance
- Tough and durable
- Can be applied in a range of environments
- Rapid return to service
- Great MVT properties comparatively
- Low/no VOC formulations
- Customizable color, profile, thickness
- Low permeability
- Low maintenance
- Properties mesh well with hygienic design

Maintenance and Inspection


Total USDA Recalls and Pounds Recalled
from FSIS Data
Total Recalls
Pounds Recalled (millions)
Number of Recalls
Pounds Recalled (millions)
Year
2020
2021
2022
2023
2024 (est)
31
47
53
65
56
1.461019
15.501273
1.354648
4.005384
19.148705
0
20
40
60
80
0
5
10
15
20


PROUDLY PUBLIX DELI FEATURING
Boar's Head
CERTAIN BOAR'S HEAD DELI MEATS RECALLED OVER POSSIBLE LISTERIA
WRAL NEWS
COVERAGE YOU CAN COUNT ON

Boar's Head Recall: by the numbers

Listeria outbreak in 2024 traced to the Boar's Head plant in Jarratt, Virginia

10 deaths 61 hospitalized

7 million lbs of product recalled

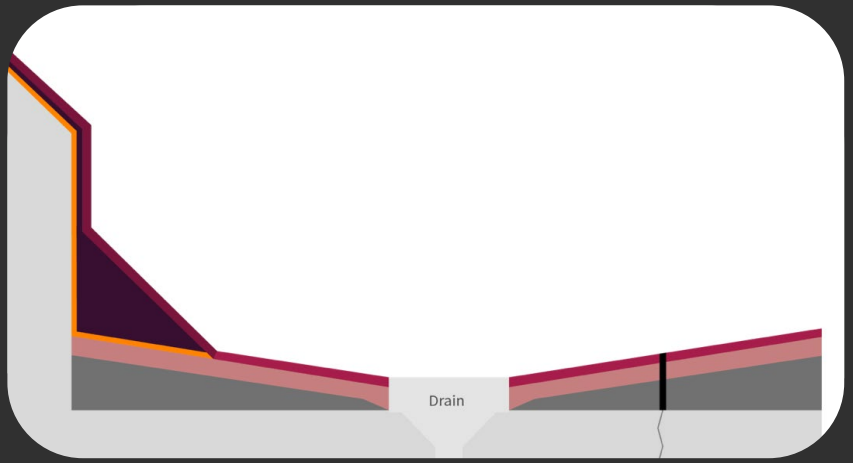
500 jobs lost with plant closure

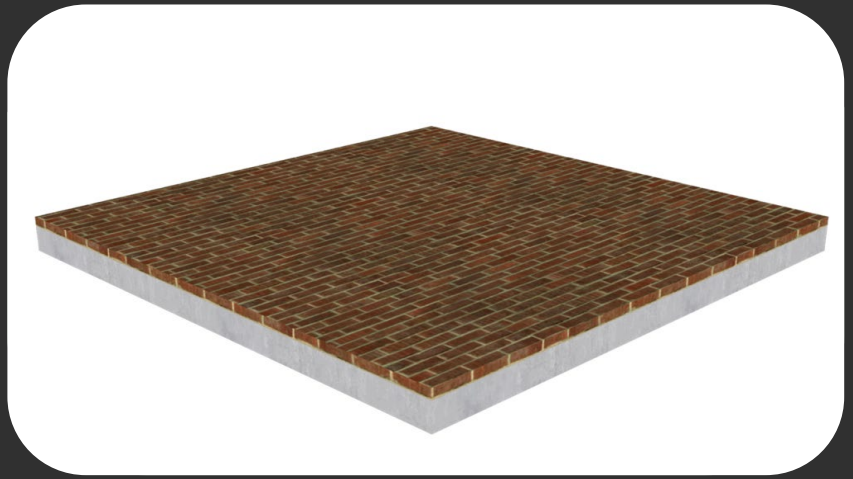
Flooring takeaways from USDA Report:

- Inspectors observed “cracks, holes and broken flooring”, which can hold moisture and contribute to wet, unsanitary conditions that support Listeria harborage and growth.
- As part of new oversight procedures, inspectors are now verifying Listeria-related risk factors weekly at all RTE facilities. This includes checking for cracked floors, which are now treated as a red flag for sanitation risk and potential harborage points for Listeria.
- New policies mandate routine inspection for physical plant defects, including floors, and integrate these observations into risk assessment algorithms for triggering in-depth inspections.

Inspecting your floor

- Identify regular maintenance points
- Recognize potential problems preemptively
- Create an inspection and maintenance program
- Train personnel on identifying potential harborages





Maintenance Points

- Drains
- Joints
- Transitions/Terminations
- Traffic paths
- Vibration and temperature thresholds

Maintenance Points: Drains

- Transition, termination, and collection point for water and organic material

Maintenance Points: Joints

- Crucial to prevent cracking
- Shorter lifespan than flooring system

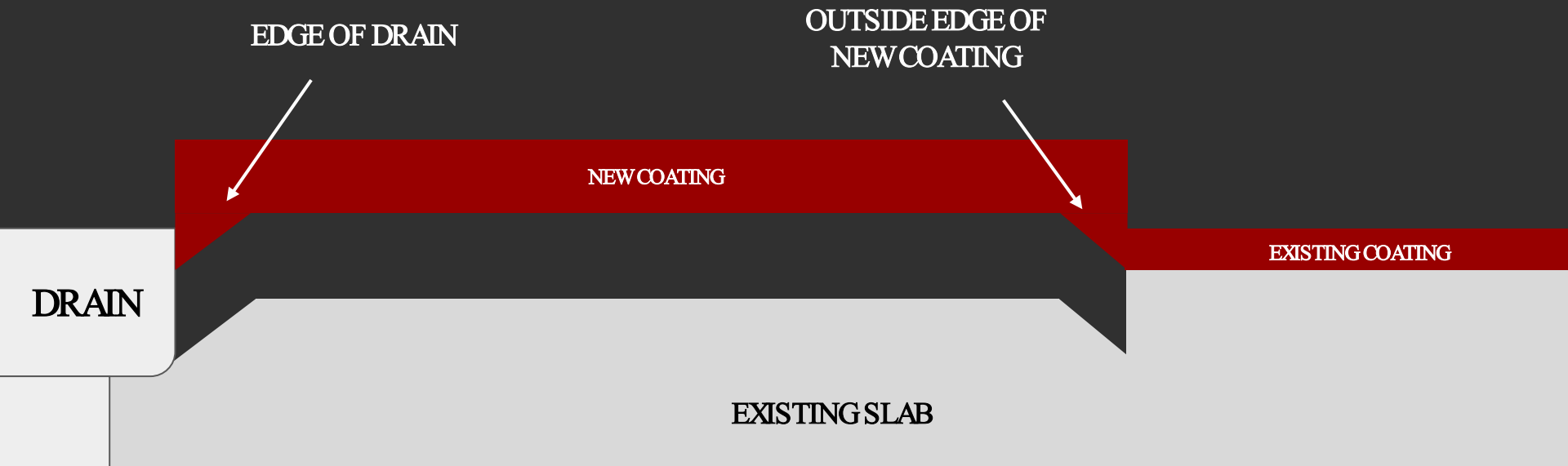
Maintenance Points: Traffic Paths

- Heavy traffic can remove non-skid properties
- Wear patterns can cause safety hazards, discolor the floor, or create an uneven surface

Maintenance Points: Transitions and Terminations

- Lots of physical abuse from rolling objects due to elevation differences
- Different materials may separate due thermal properties during temp swings

Importance of Keying in Terminations



Importance of Keying in Terminations

EDGE OF DRAIN

DRAIN

NEW COATING

EXISTING COATING

EXISTING SLAB

Maintenance Points: Vibration and Temperature Thresholds

- Vibrations from machinery absorbed by floors can cause cracking or delamination
- Temperature thresholds from areas around coolers, freezers, cookers, ovens and fryers can be maintenance points

Mitigating potential issues without invasive repair

Issue		Possible Solution
Hot grease dripping onto the floor Undiluted chemicals collecting on the floor		Stainless catch pans
Gouges in the floor from pallets		Plastic pallets and/or increased training
Staining from chemical exposure		Post chemical exposure rinse
Wheels wearing floor prematurely		Softer wheels
Chemical leaks		Verify that gaskets are resistant to chemical type and fit well

Instituting a Maintenance Program

- Schedule routine inspections
- Training- know what to look for
- Keep a record

- Identify maintenance points
- Mitigate potential issues
- Report issues and investigate cause and severity

- Schedule time for regular maintenance
- Don’t let problems fester
- Work with a trustworthy contractor

- Schedule routine inspections
- Training - know what to look for
- Keep a record

- Identify maintenance points
- Mitigate potential issues
- Report issues and investigate cause and severity

- Schedule time for regular maintenance
- Don’t let problems fester
- Work with a trustworthy contractor

Contractor Selection

Why It Matters

- Contractor has same responsibility to safety and quality that your company does
- The outcome of the project can directly affect the quality of your product

Factors to Consider

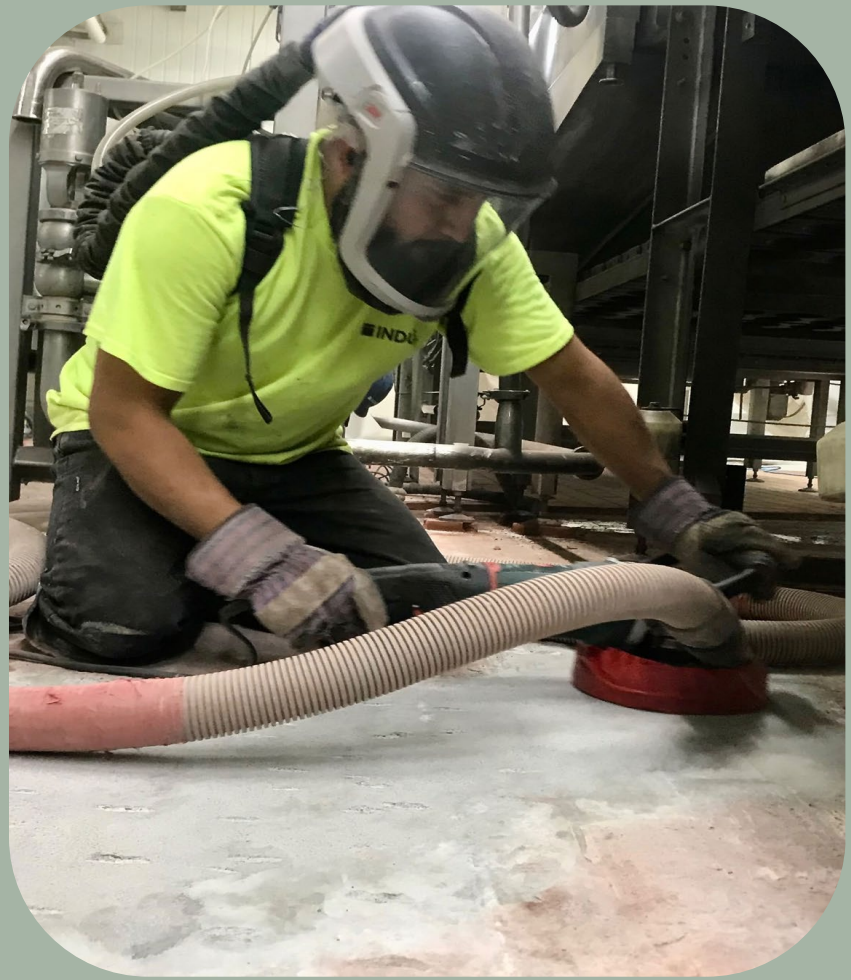
Experience In The Industry

- Unique Challenges
- Harsh environments
- Tight timelines

Factors to Consider

Familiarity With Safety and Industry Standards

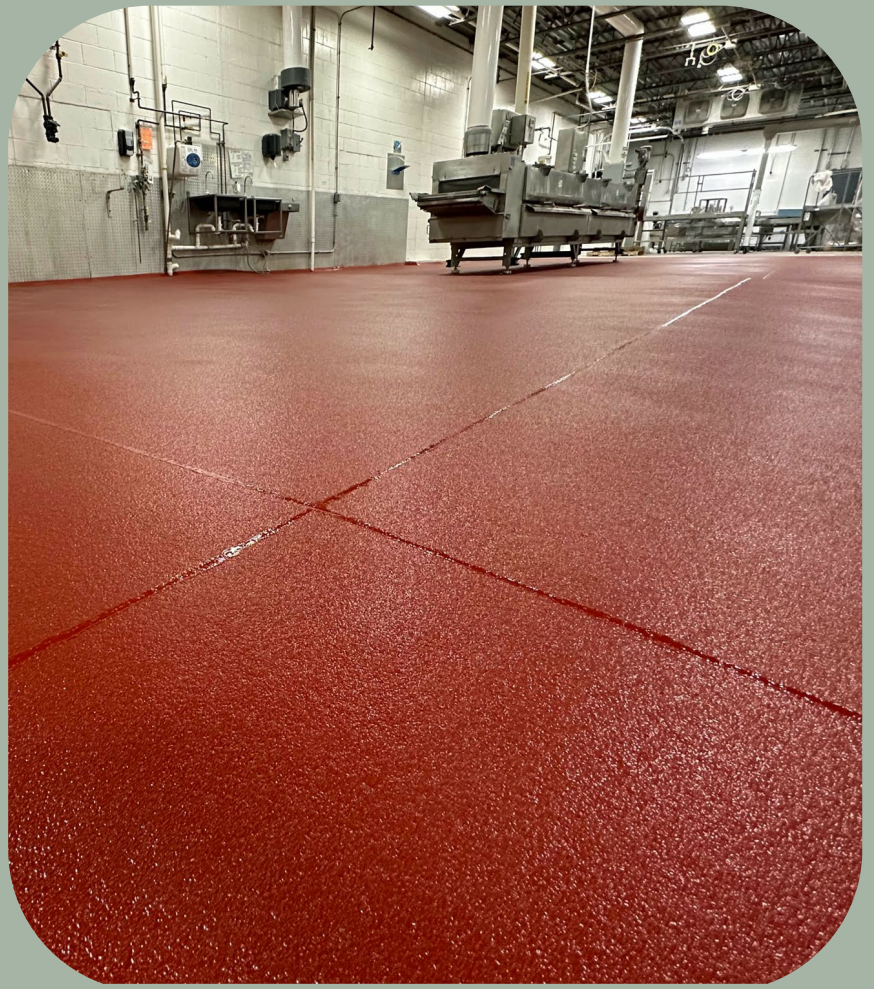
- Understand the importance of protecting the foodstream
- Follow GMP's, industry safety standards, and site specific protocols
- Work safely to protect themselves and plant personnel



Factors to Consider

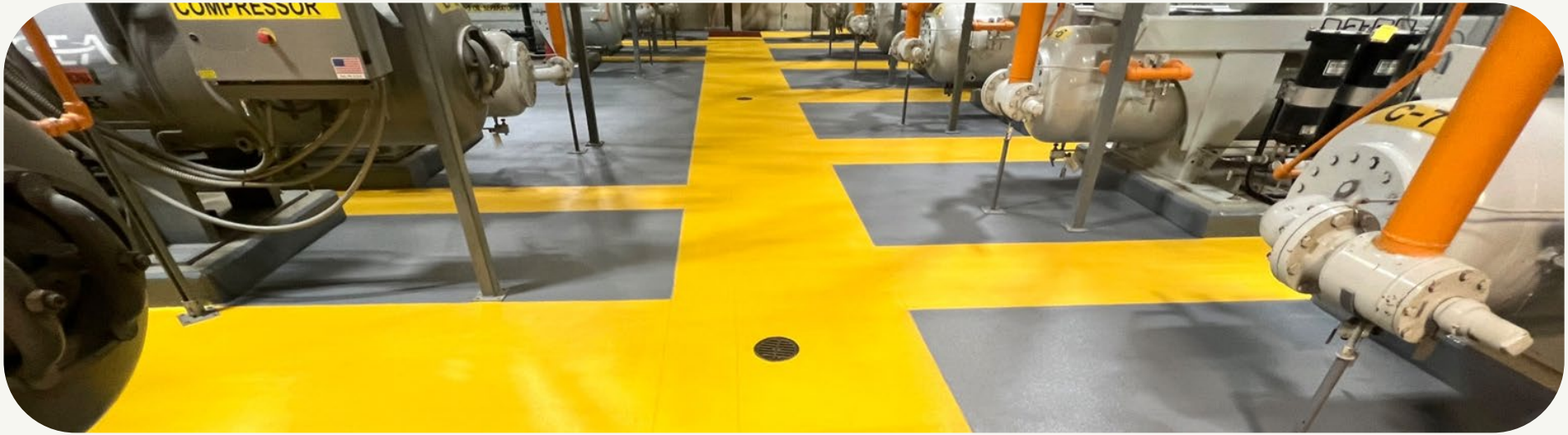
Matching the Right Products & Process with Environment

- Understand the environmental stressors and limitations that will affect the material
- Familiarity with their products and processes in food manufacturing environments



Your Contractor needs to:

- Know the challenges
- Emphasize safety
- Understand how the floor fits into sanitary design



Indue Industrial Flooring

Thank You!

indue.com