

**REACHING  
HIGHER**

## Slip and Fall Prevention: Back To Basics

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# Agenda

1. Financial impact of falls
2. Critical same-level fall hazards
3. Slip/Fall prevention best practices
4. Key components of a slip/fall prevention program

<http://www.emcins.com/LossControl/safetyPrograms/slip-and-fall.html>

# Walking and Working Surfaces, 1910.21

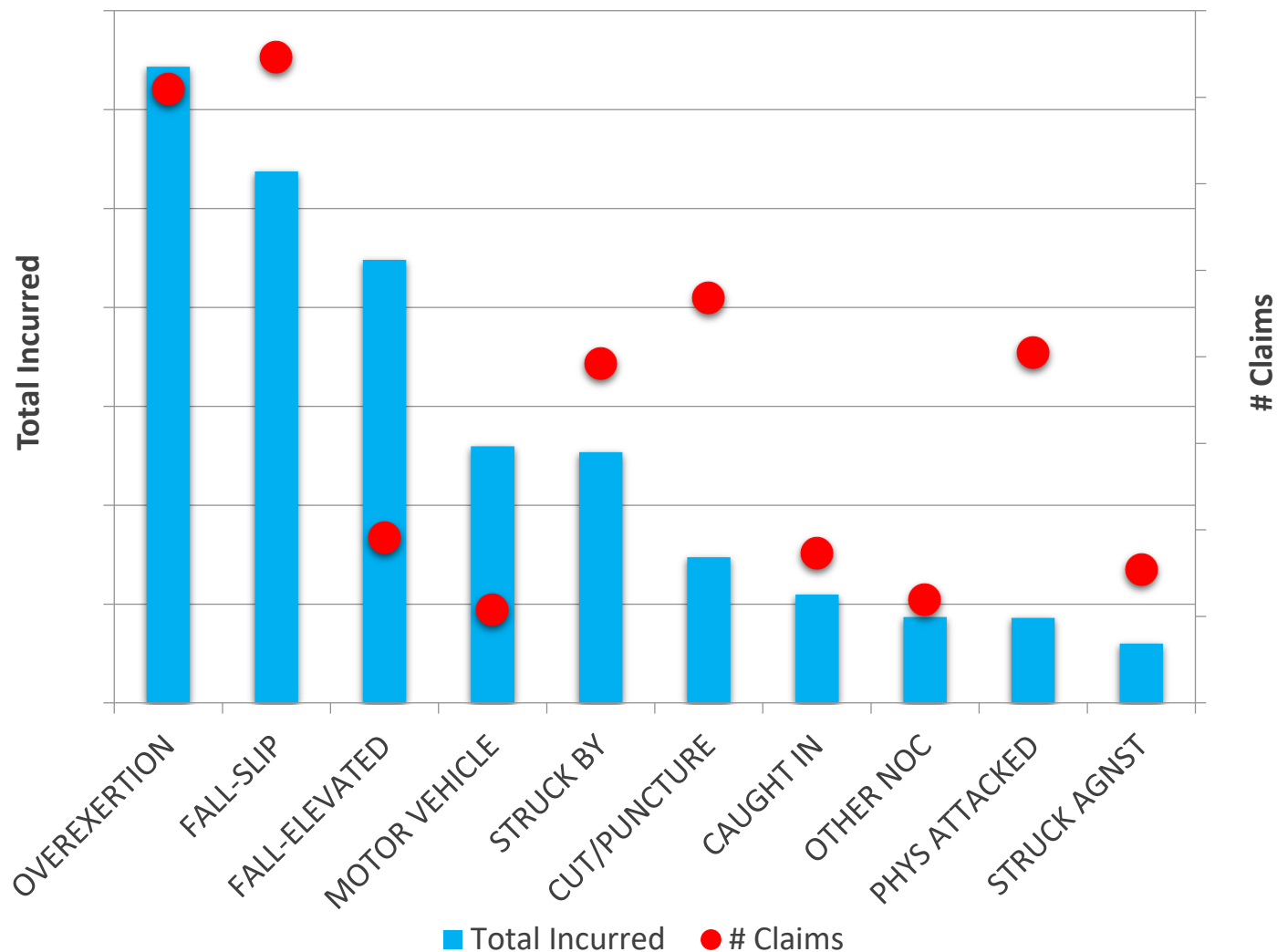
*Effective 1/17/2017*

(d) **Inspection, maintenance, and repair.** (1) The employer shall ensure through **regular and periodic inspection** and maintenance that walking and working surfaces are in **safe condition** for employee use.

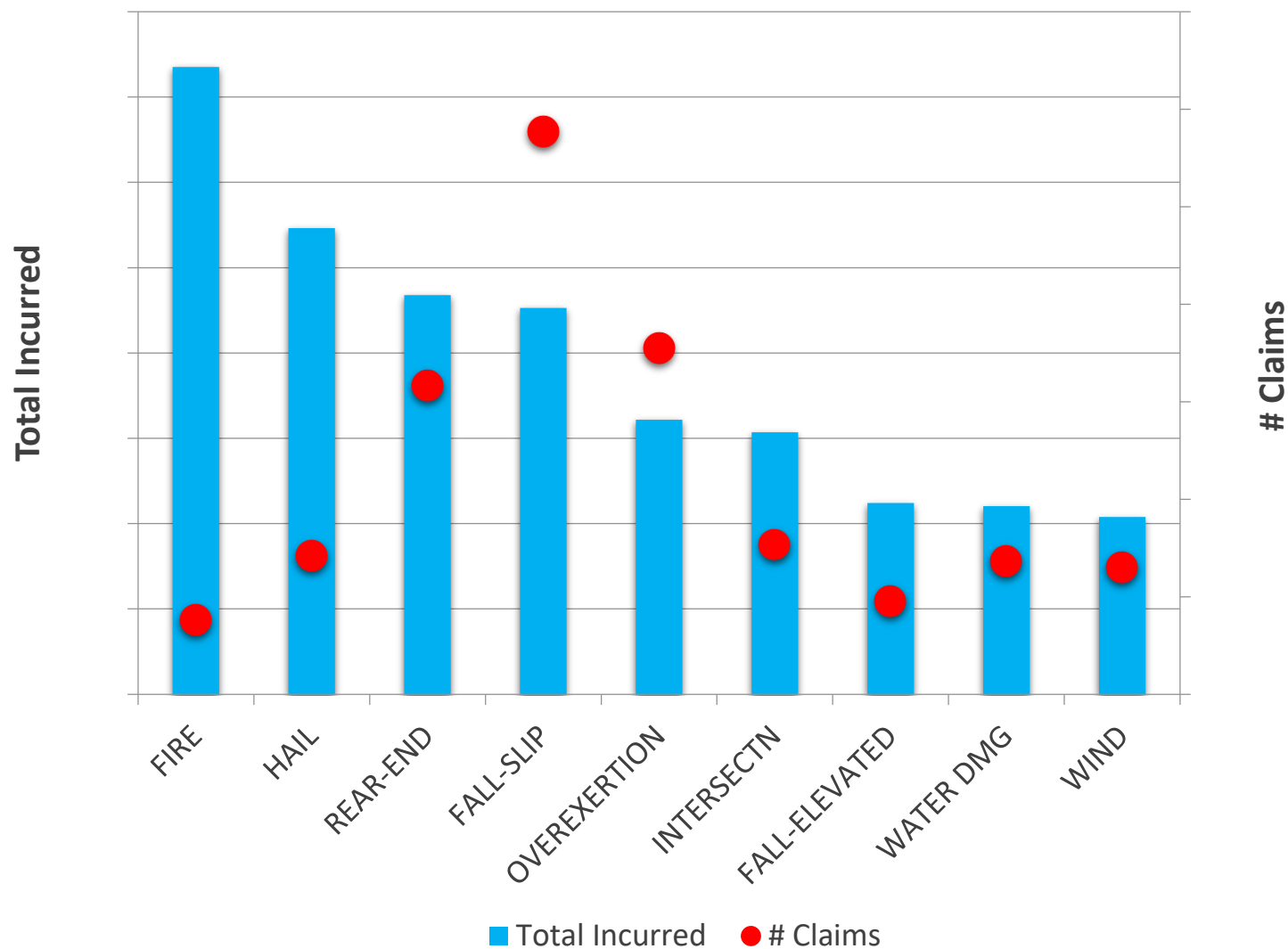
(2) The employer shall ensure that all **hazardous conditions** which are discovered are **corrected, repaired**, or temporarily guarded to prevent employee use. Repairs shall be made in a manner that will **restore the walking and working surface to a safe condition** for employee use.

(3) Only **qualified persons** shall be permitted to inspect, maintain or repair walking and working surfaces except for the incidental cleanup of non-toxic materials.

# Top Workplace Injuries

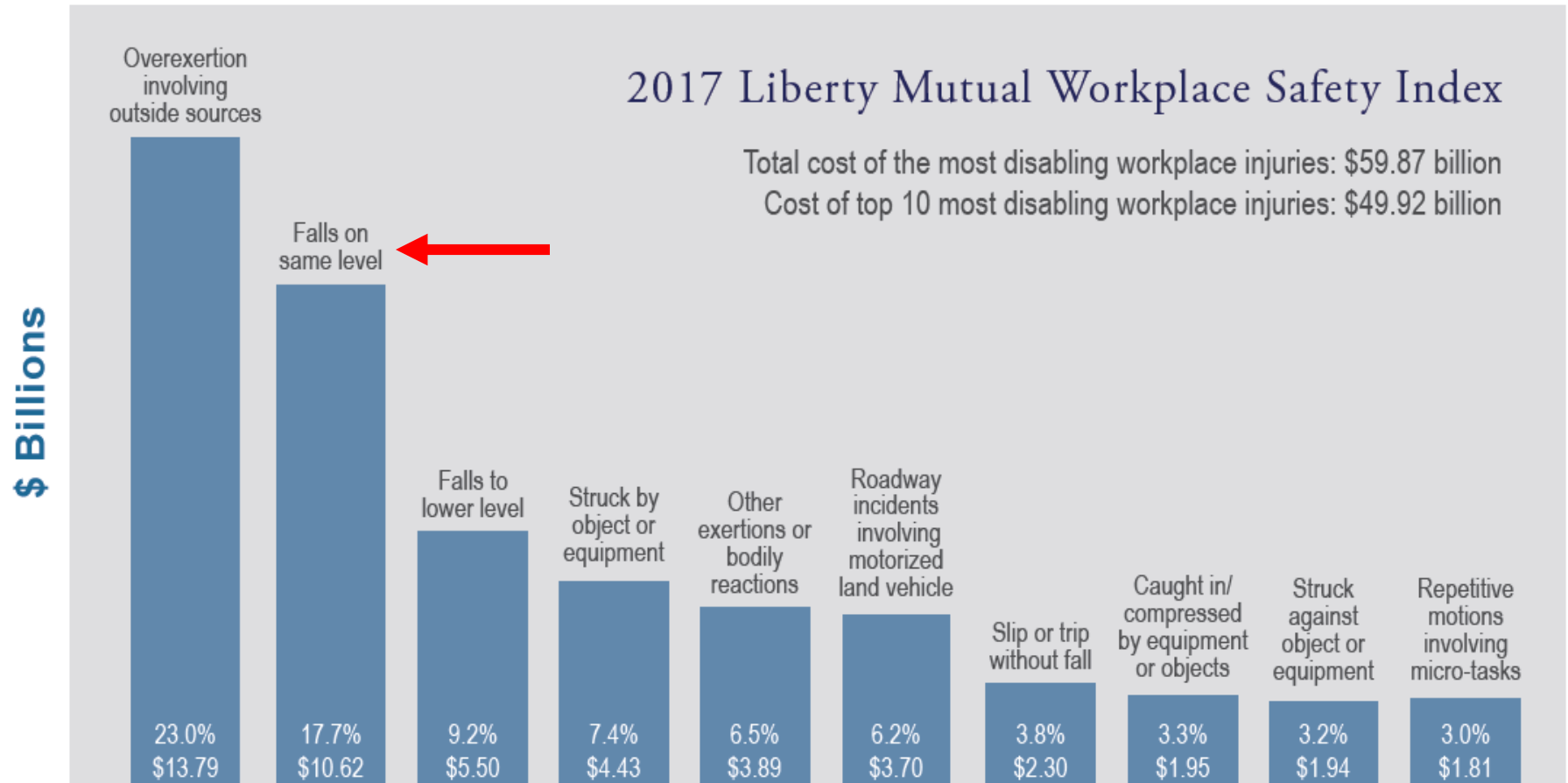


# Top Casualty Losses

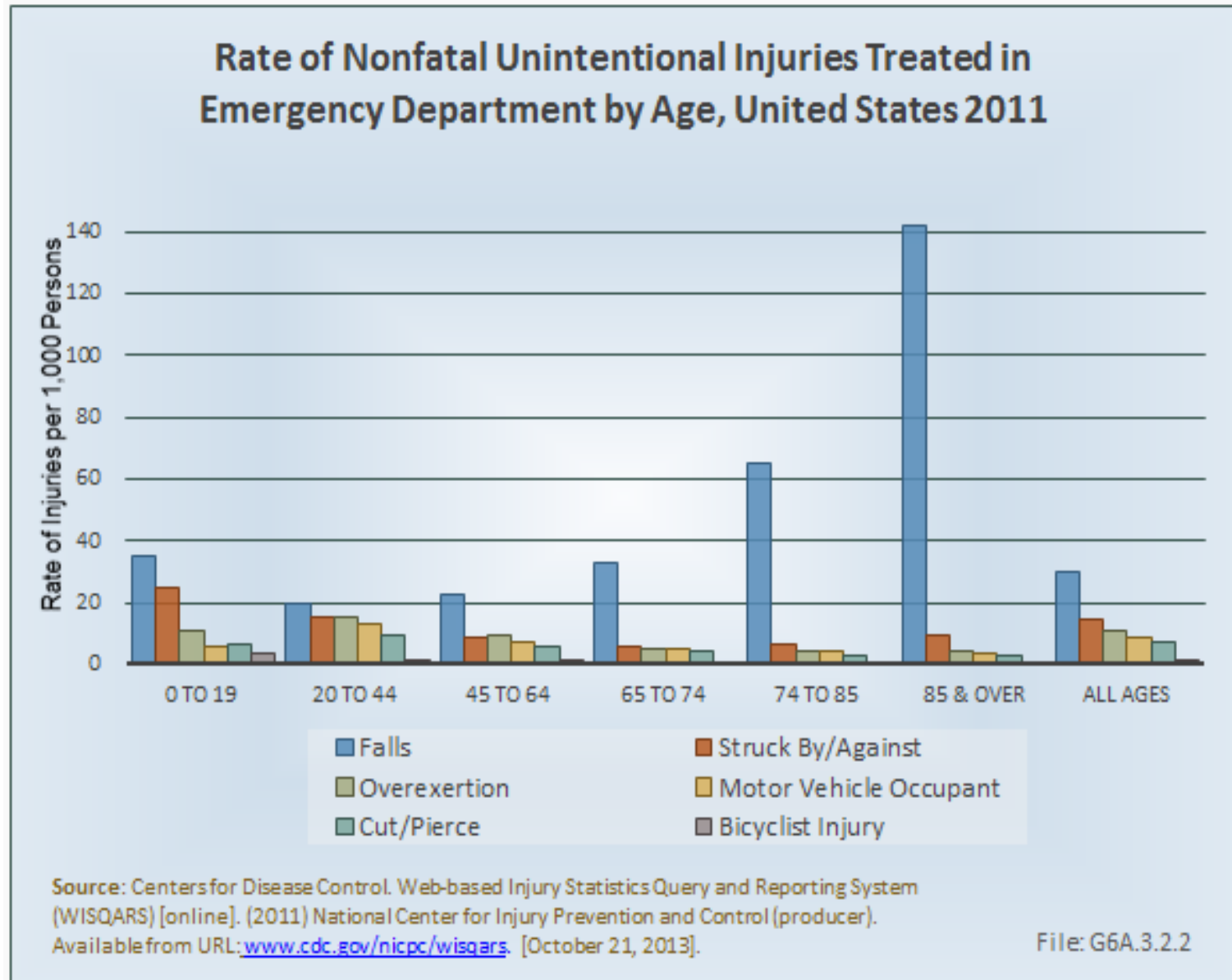


# Liberty Mutual Workplace Safety Index 2017

## Top 10 Causes and Direct Costs of the Most Disabling U.S. Workplace Injuries<sup>1,2</sup>



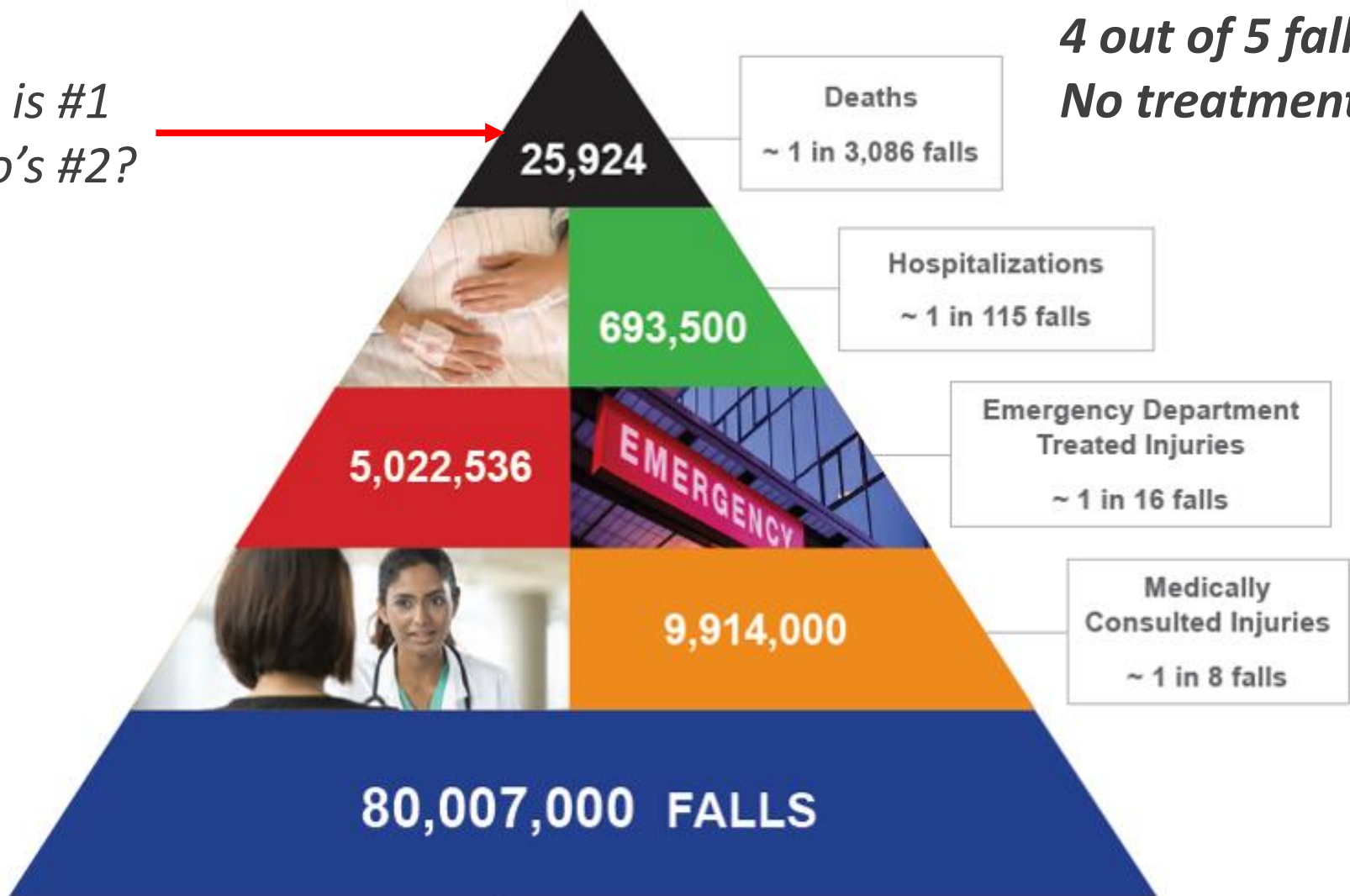
# Not Just A Senior Issue



# National Statistics - Falls

USA is #1  
Who's #2?

*4 out of 5 falls:  
No treatment*

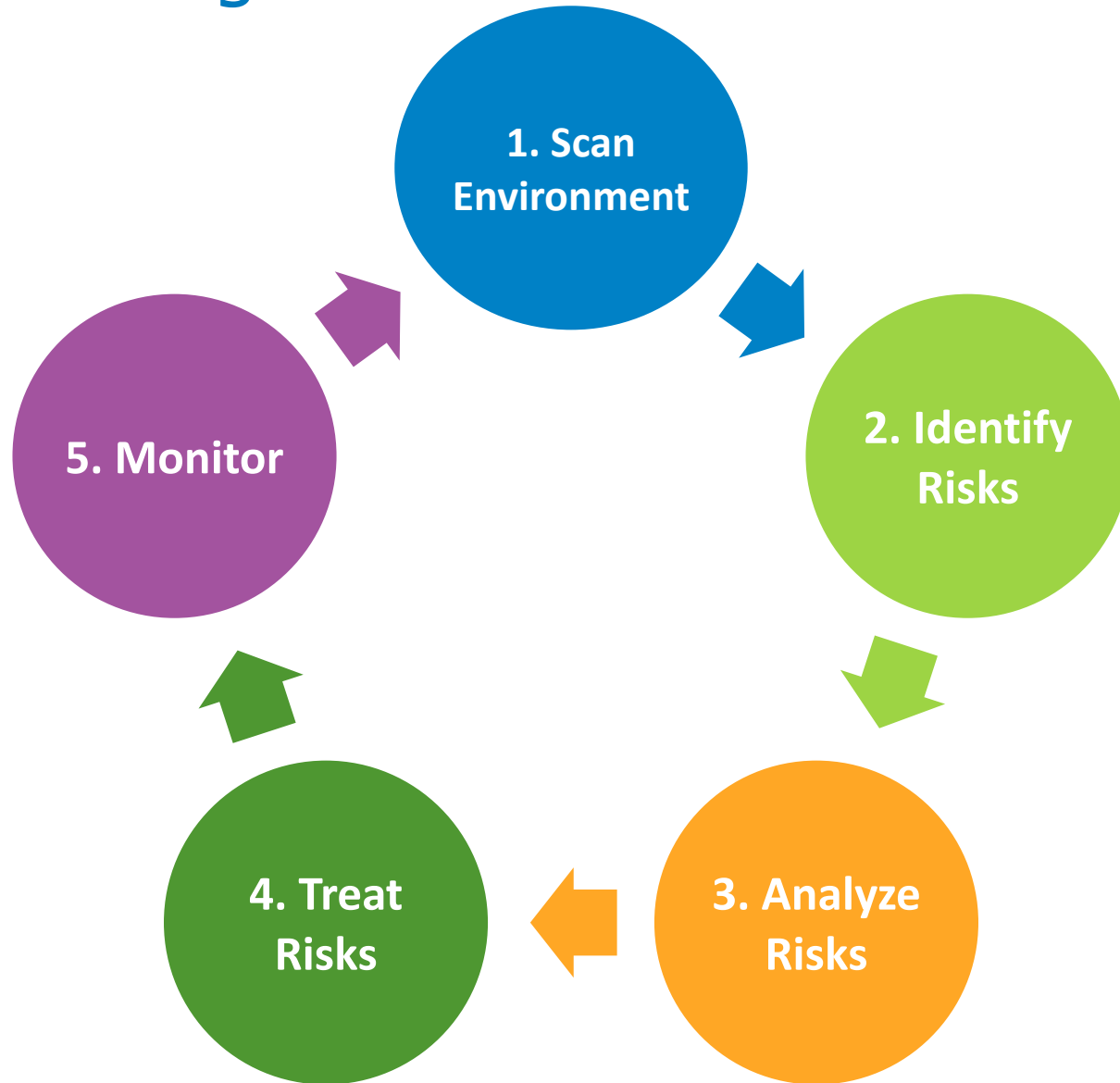


# Biggest Mistakes Businesses Make



1. No program / no one in charge
2. Not performing regular walkway audits
3. Unsure what constitutes a fall hazard
4. Unaware of floor traction and remedies
5. Slow to address hazards

# Risk Management Process



# Why Do people Fall?

## Critical Environmental Hazards

- ☐ Uneven surfaces ***#1 Issue***
- ☐ Slippery surfaces
- ☐ Obstacles

## Personal Risk Factors

- ☐ **Complacency**
- ☐ **Distractions**
- ☐ Personal health factors

# Not Sensitive To Risks



**Dark, Icy, Uneven, Carrying Bulky Load**

# Construction/Maintenance Activities



**Greatly Increases Risk – Requires Frequent Auditing**

- ☐ Cords, hoses, other obstructions
- ☐ Wet, contaminated or damaged walking surfaces
- ☐ Poor quality or inappropriate mats

# Maintenance Activity



**Obstructions**

# Slip, Trips, Falls – Universal Hazards

- 1. Uneven walking surfaces**
2. Slippery floors, wet or oily
3. Ice patches - parking lots/sidewalks
4. Inadequate mat strategy
5. Improper footwear
6. Cords, clutter and obstacles
7. Stairs – condition, handrails
8. Inadequate illumination

# Uneven Surfaces – Obvious?



Slab settled 2", broken hand

# Less Obvious Hazard



Snow accumulation is a clue surface is uneven

# Repairs - Mud jacking



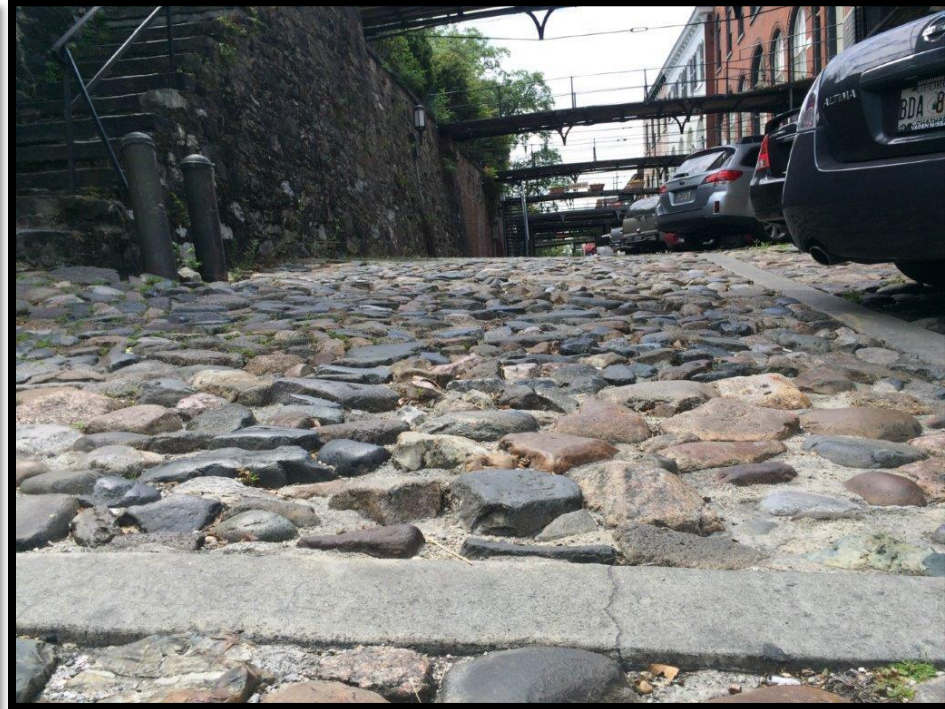
Same area after repairs

# Why Wasn't This Noticed And Fixed?



1" raised edge. Person with walker fell face-first

# Which Is Safer?



# Subtle Risk = Complacency?



5/8" raised edge = broken wrist

# Preventing Trips?



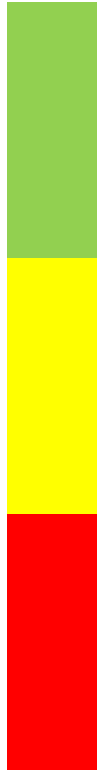
# Eliminating Hazards Is Always Best



# Hierarchy of Hazard Control



Most Effective



Eliminate

Identify/Isolate

Warn

Least Effective

# Hall Of Shame



**Eliminating hazard is always best!**

# Fall Risk? Bank On It!



**Customer stumbled at curb when leaving bank  
Broken collarbone, concussion**

# Uneven Surfaces – Urgent Care Clinic



*Built-up curb ramps are not recommended*

# Is This A Solution?



*Repaved and repainted the lot, but.....  
Same hazard remains!*

# Solution - Awareness



Paint or stain sloped surfaces

# Reactive vs. Proactive



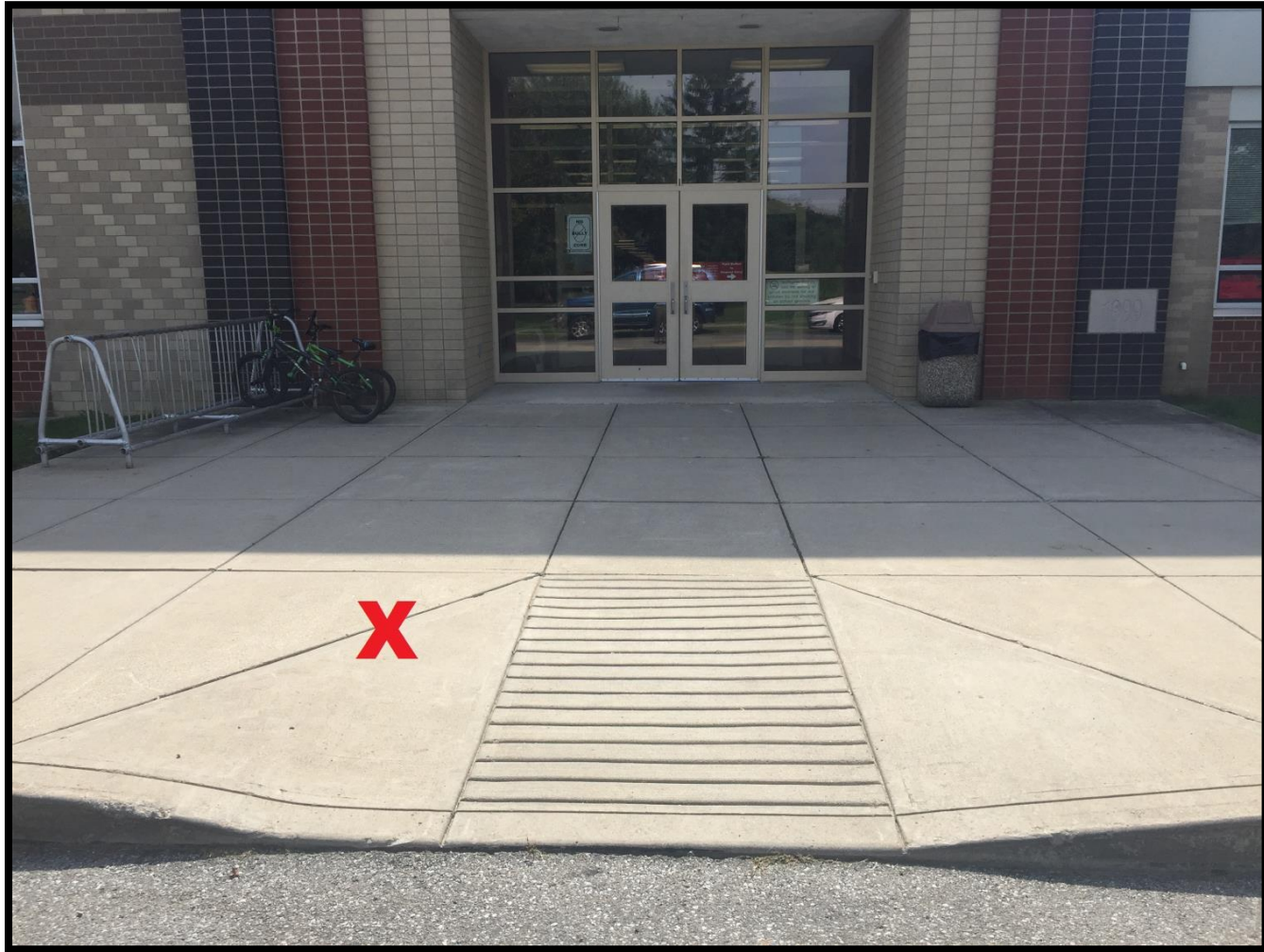
**1" Raised edge = broken wrist. Painted after injury**

# Short Flight Stairs



**Stripe each edge and use mineral aggregate**

# Flared Side Not Marked



Concrete – asphalt transitions often uneven

# You Make The Call



# Ramp Edge Not Marked



5/8" high here. Stumbled face forward.

# Best Practice



**Highlight flared sides**

**Use mineral aggregate for slip resistance**

# Missing The Mark



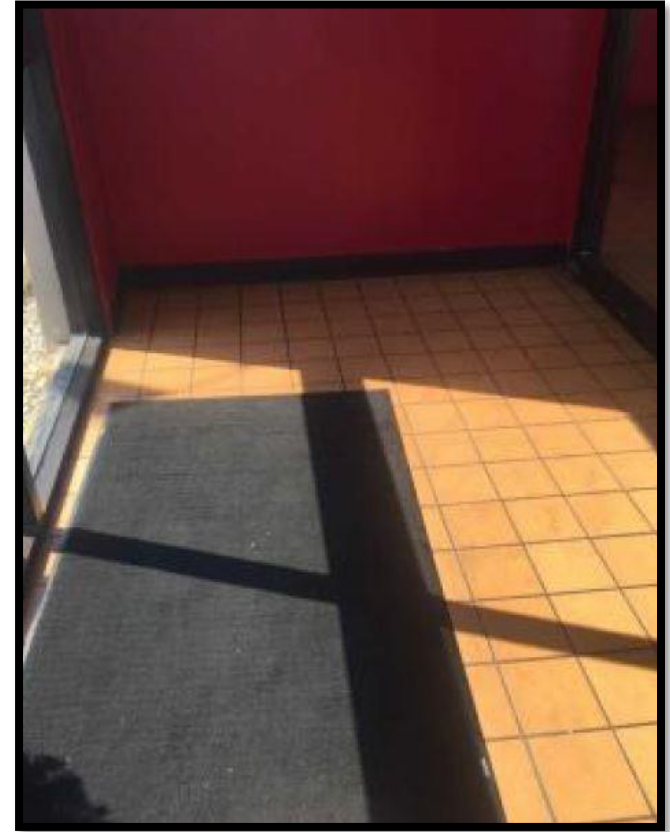
Don't paint flat section – idea is to highlight flared sides

# Don't Forget Traction



Low traction, need mineral aggregate

# Slippery Surfaces



**Puddles = Wet shoes = Broken femur**

**Contributing factor: ceramic tile traction, small mat**

# Floor Traction – ANSI/NFSI Standards

- ✓ *ANSI/NFSI B101.0 2011: SCOF  $\geq 0.6$  high traction, .4 – .6 moderate*
- ✓ *ANSI/NFSI B101.3 2012: DCOF  $\geq 0.42$  high traction, .3 -.42 moderate*

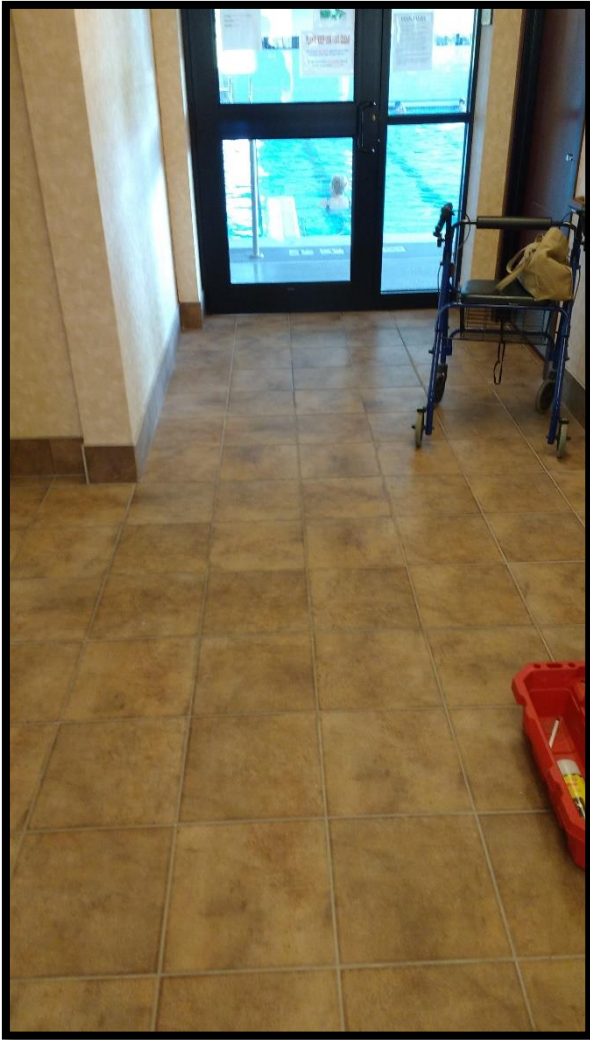


# Floor Traction – Senior Campus



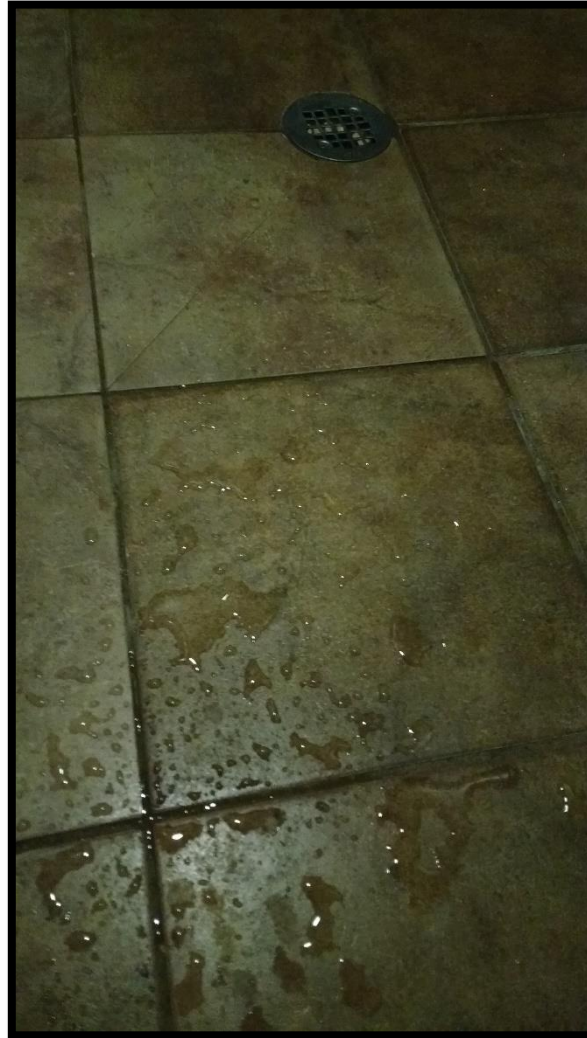
**Low traction ceramic tile, wiper mat not effective**

# Floor Traction – Senior Campus



Simple treatment – now high traction, no mat needed

# Floor Traction – Senior Campus



*Note water beading*

*Poor lighting too!*

Showers need more help, recommend SCOF > 0.8

# Floor Traction – Senior Campus



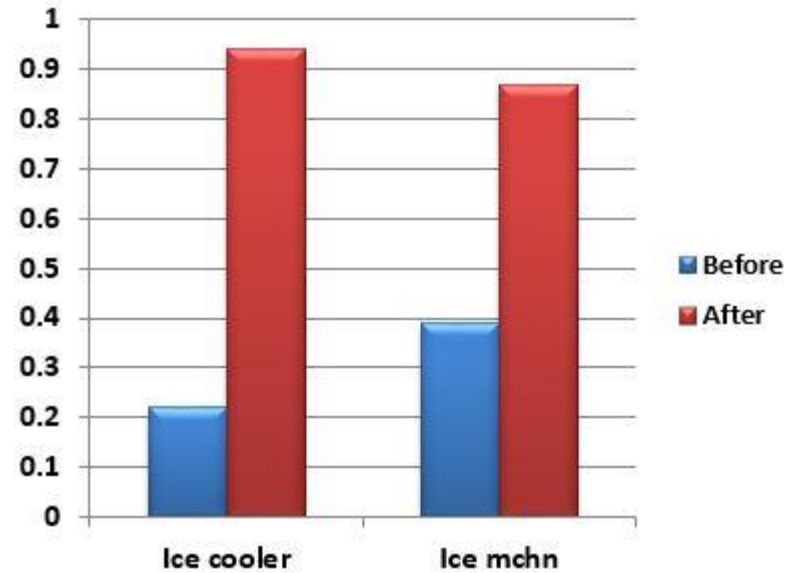
|                                   | Traction (Wet SCOF) |  |   | Values      |
|-----------------------------------|---------------------|--|---|-------------|
| Pool deck - epoxy coating         |                     |  | ↔ | 1.17 - 1.27 |
| Pool shower - ceramic             | ↔                   |  |   | 0.45        |
| Entrance to locker room - ceramic |                     |  | ↔ | .93 - .97   |
| Mens locker room shower - ceramic | ↔                   |  |   | .35 - .47   |
| Shower by door to pool - ceramic  | ↔                   |  |   | .39 - .43   |

# Floor Traction – More Is Better



Crazy use of a mat

Store 130 Traction Study



# Floor Traction



Ceramic tile, unknown traction, fell when turning  
Turns require about 40% more traction

# Variable/Unknown Traction



**Abrupt change in traction, turn. Snowy day. Wet soles?  
Shoulder and head injuries**

# Got Traction?



Rainy day but no puddles. SCOF = 0.15

# Traction



Abrupt change in traction at ER entrance

# Slip Resistant Footwear



*Studies show at least 50% reduction in slips\**

- SNEEZED-BOOT SLIPPED-FELL-DISLOCATED SHOULDER
- WEARNG FLIP FLOPS SLIPPD ON WET FLOOR- DIED

\* Liberty Mutual Research Institute: Slips and Falls in Restaurants, 2011

# Poor drainage/water management



Slippery algae, neck/back injuries

# Directional Drainage

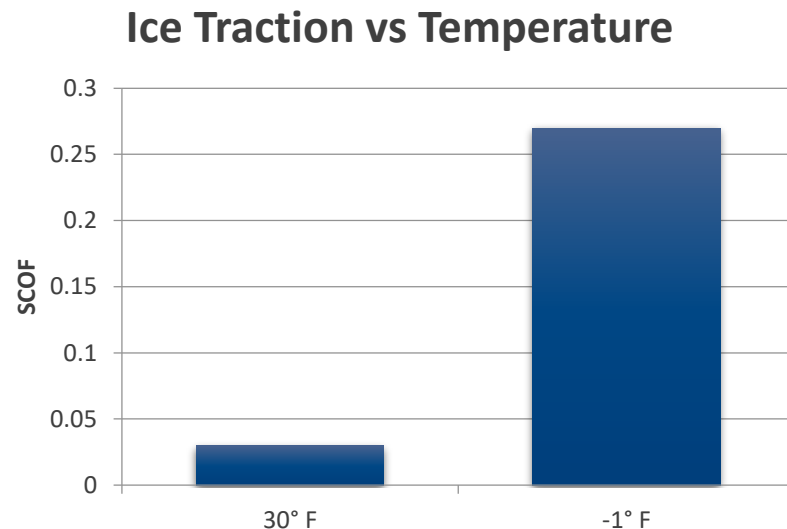


# #1 Seasonal Issue: Snow/Ice Management

- Everyone expects a safe environment
- 100% dry clear pavement hard to achieve
- Timeliness of response is critical
- Best Results: Mechanical removal combined with chemicals and abrasives as needed

*Assign someone to oversee program  
Increase audit frequency –  
conditions can change rapidly*

# Thaw/Refreeze



**37° air temperature at 7:00 am**  
**22° pavement temperature**

# Snow/Ice Management

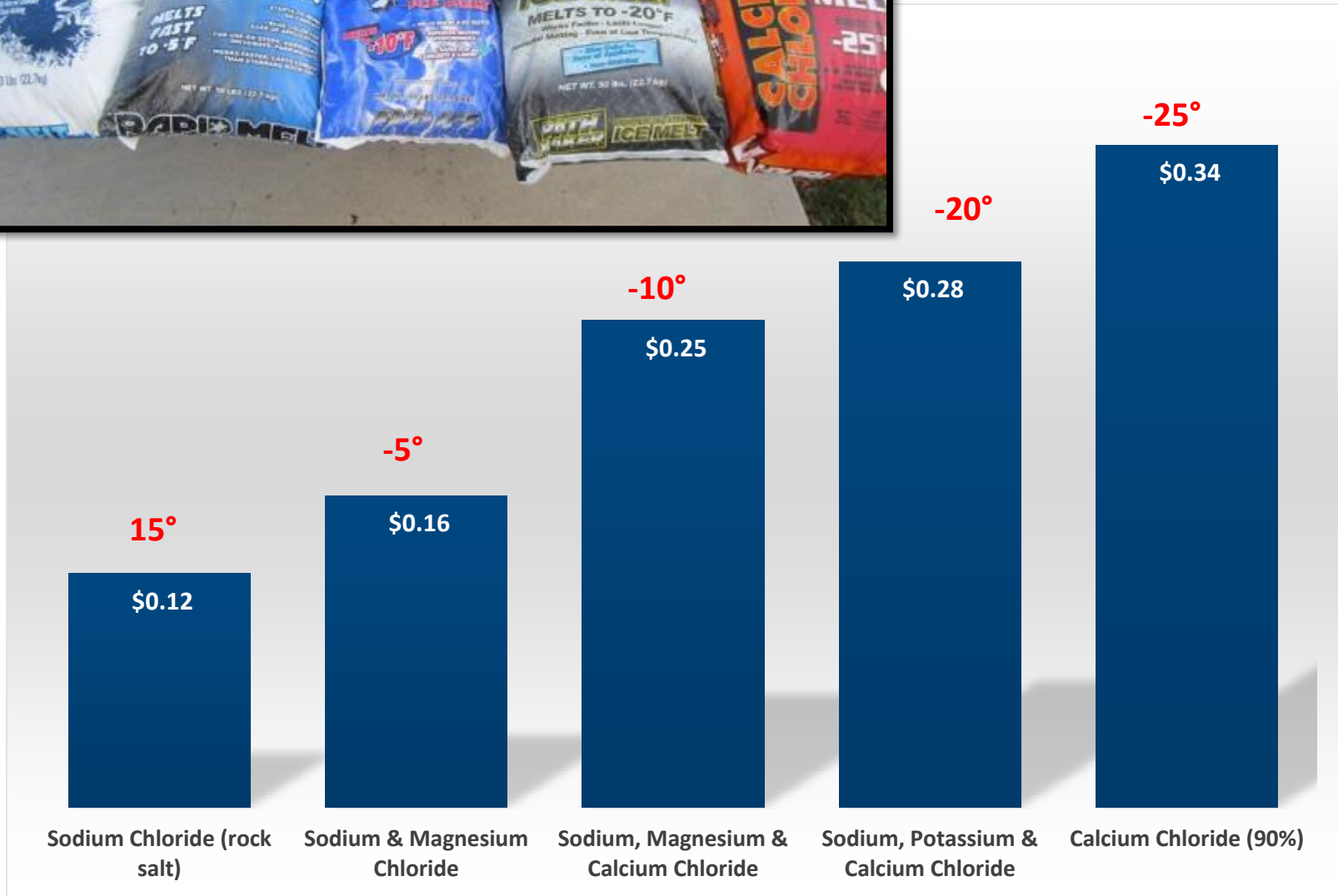


- Have a site plan
- Depth/weather triggers
- Timing. Coordinate parking, plow after hours
- Salt services
- Thaw/refreeze follow up

# Thaw/Refreeze – Monitor Frequently



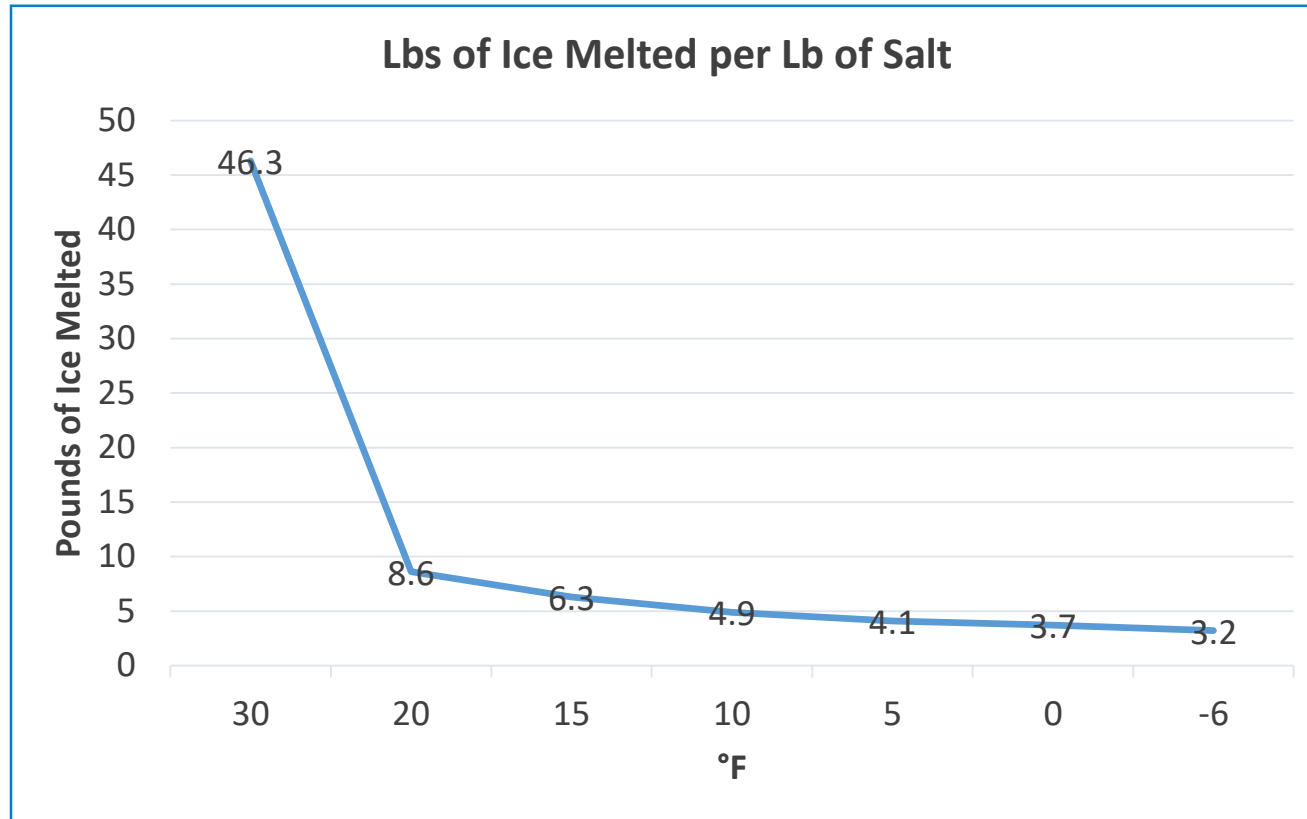
Ice not expected, was due to roof melt. No gutters



# Top Ice Melt Chemicals

1. **Rock Salt.** Cheap and readily available. Best in the 20 – 30° F range
2. **Magnesium Chloride.** High performance and lower environmental impact. Good to -15° F
3. **Calcium Chloride.** Widely used premium deicer, good to -25° F. Works fast
4. **Acetates.** No chlorides so low corrosion potential. Expensive.

# Temperature Matters



Salt's effectiveness drops off exponentially below 25 °F  
**Don't use ice melt to simply melt snow/ice – shovel or plow first**

# Salt Brine Pre-treatment



- Prevents snow/ice from bonding to surface
- Allows more efficient, effective plowing/shoveling
- Reduces waste and salt used
- Faster melting

# Salt Brine Pre-treatment



- Apply hours before storm for best results.
- 2.2 lbs salt per gallon of water
- Effective down to 15° F.
- Not recommended for:
  - Freezing rain or rain turning to snow
  - Very cold temperatures with dry blowing snow

# Too Much Ice Melt?



- Increases floor maintenance costs
- Can cause slippery floors, especially Calcium Chloride
- Environmental impact

# Post Event Cleanup



Residual sand can be slippery and clog storm sewers

# What About New Concrete?

- No chlorides for 2 years
- Use Acetates or abrasives only, or....
- Apply a sealer

Typical spalling damage



- Generally not a chemical attack
- Melted ice enters air pockets and expands when refreezing

# Frequent Site Monitoring – Winter/Early Spring

OSHA's new rule on walking-working surfaces requires employers to “**inspect walking-working surfaces regularly and correct, repair, or guard against hazardous conditions**” – January 17, 2017

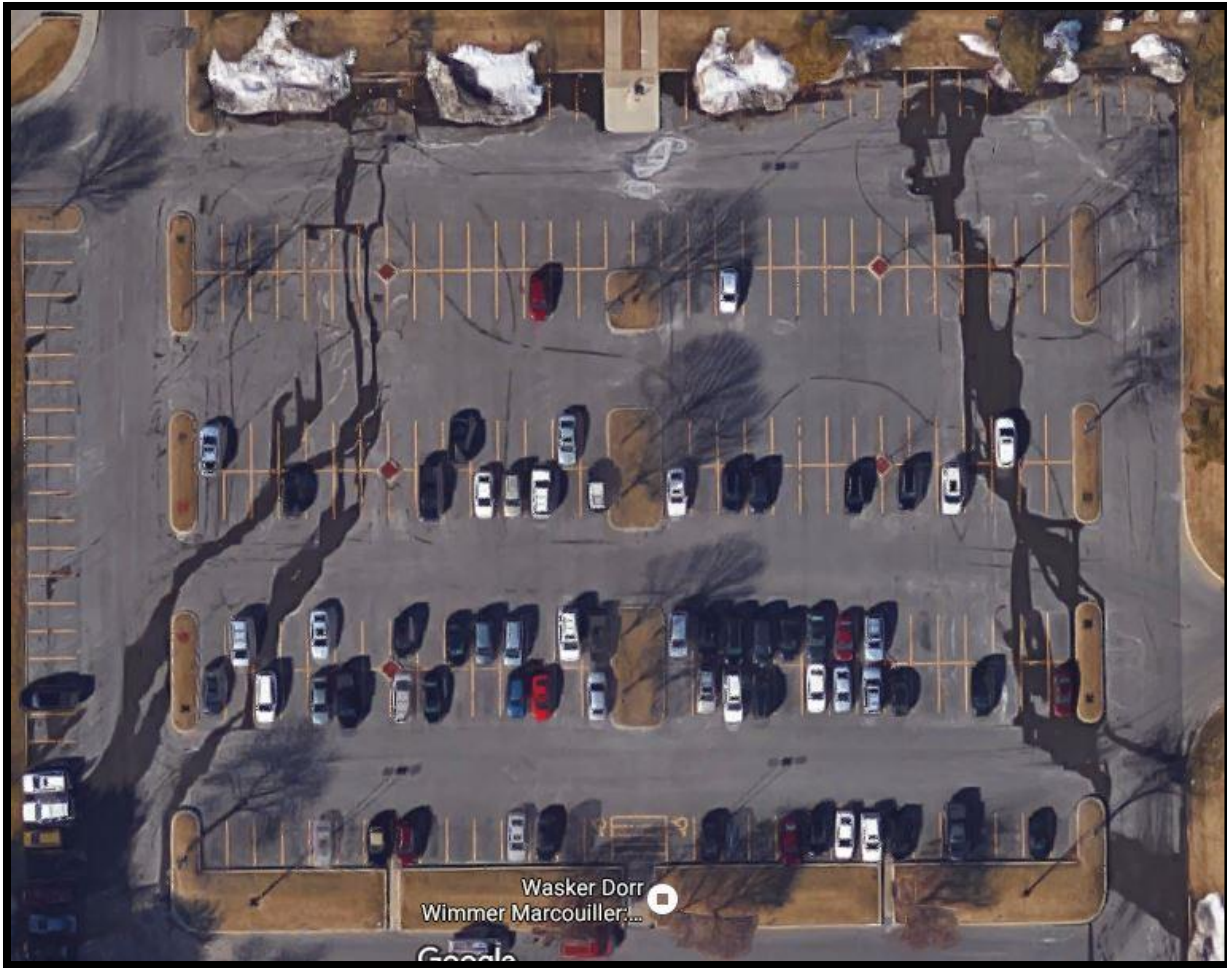
- **Flat areas:** Melted snow may pool and refreeze.
- **Blowing snow:** Windy conditions can undo plowing efforts.
- **Handicapped parking spaces:** Pay special attention to these spaces. Users need more traction.
- **Sidewalks:** Sidewalks tend to freeze faster. Frequent monitoring is critical.
- **Icicles:** Remove icicles from buildings - they can melt, drip and refreeze on the pavement. Falling icicles can also be a hazard.
- **North side of buildings:** These areas tend to be more shaded and don't benefit from direct sun for melting.

# Snow/Ice Management



Review site with contractor or staff before winter  
Identify problem areas and obstacles for plows

# Thaw/Refreeze: Snow Plow Strategy

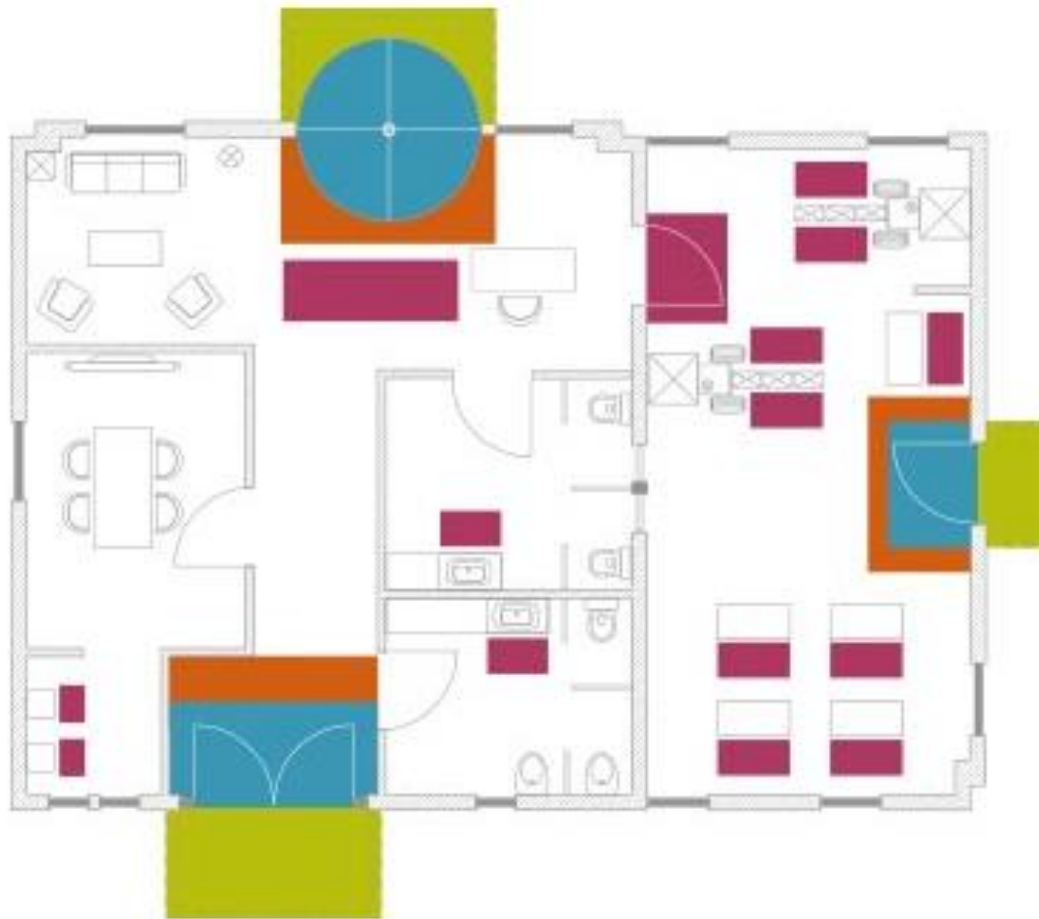


# Obstacles



Anything wrong here?

# Mat Strategy



-  Outdoor scraper
-  Dual action: scrape/absorb  
Walk-off carpet tiles
-  Wiper action
-  Wet areas or anti-fatigue

# Mat Strategy



Outdoor scraper

Outside door



Dual action: scrape/absorb or  
Walk-off carpet tiles

Inside doorway



# Mat Strategy



Wiper action

**Additional walk off  
non-slip backing**



Wet areas or anti-fatigue



# Making Mats Safer



Edge taping

# Grippy Mat



Disposable wiper mats – adhesive backed

# More Harm Than Good?



**Curled edge kicked up - Shoulder and hip injuries**

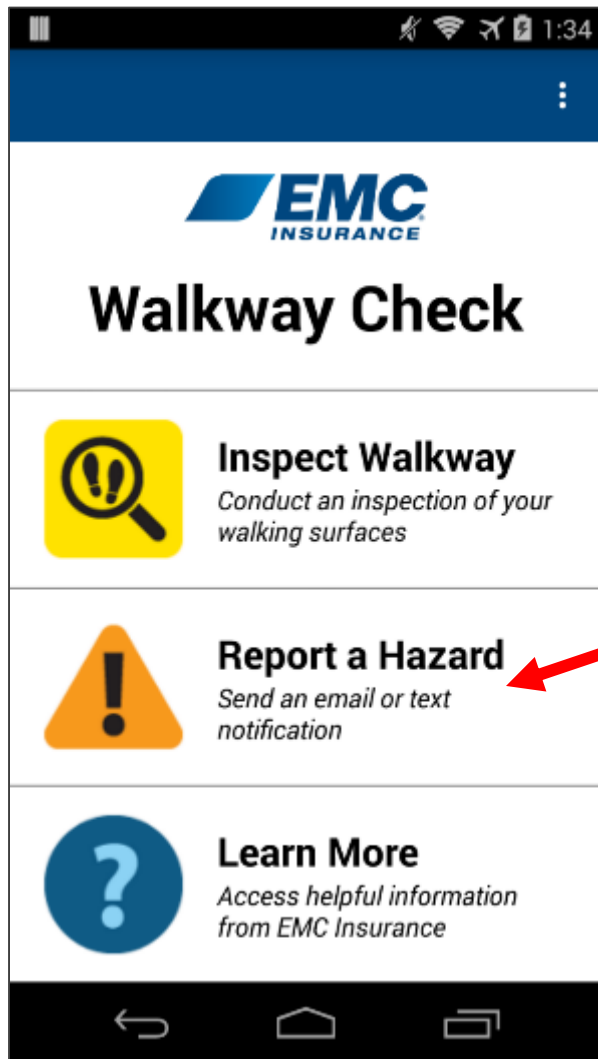
# Putting It All Together

## **Walking Surface Safety Program**

1. Train staff to recognize & correct or isolate hazards
  - ✓ Walkway safety basics, floor maintenance procedures, proper use of signs, spill clean up
2. Perform regular walkway audits, include lighting \*
3. Provide easy way for employees to report hazards \*
4. Test hard-surfaced flooring for traction. Choose the right floor type (ANSI B101.5, high traction)
5. Written snow/ice management program
6. Mat safety program: when/where, inspect/replace
7. Require appropriate footwear

**\* Try EMC's Walkway Check App**

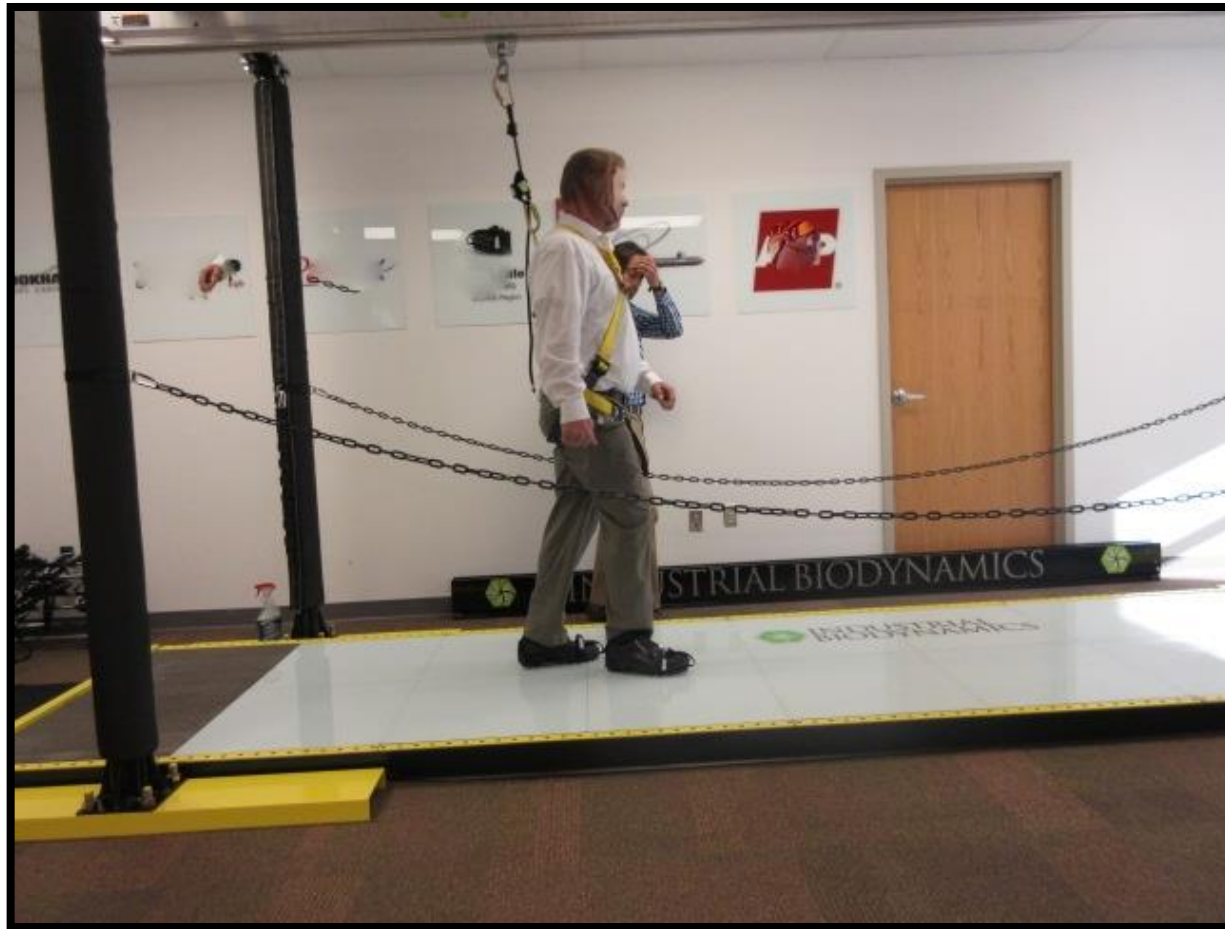
# Empower Staff to Report Hazards



# Putting It All Together



# Addressing Human Factors



# TCNA Updated Test Method: AccuTest



**DCOF AccuTest replaces ASTM C1028**

**Uses BOT-3000, 0.42 is high traction threshold (DCOF)**

**Uses sodium lauryl sulfate, a common real world residue**

# Safe Walking Tips For Everyone

- Always take the safest route – avoid short cuts
- Don't rush, especially on slippery surfaces or low light conditions.
- Don't use your smartphone while walking.
- Walk deliberately on slippery surfaces. Take slow, short, flat-footed steps.
- Inspect shoe/boot outsoles monthly, especially heels
- Wear slip-resistant footwear, especially if exposed to wet environments.
- Look out for "black ice." Often shows up early in the morning, or in areas that are shaded from the sun.
- Use caution when getting in and out of vehicles, use the vehicle for support.
- When entering a building, remove as much snow and water from your boots as you can. Walk carefully on hard-surfaced floors – even if there are no puddles your outsoles may be wet.
- Avoid carrying items. Keep hands empty and outside pockets so arms are free to move for stabilization. If you must carry items, use backpacks.
- When walking on steps, always use the hand rail and plant your feet firmly on each step.

*count on*



FOCUSED