OSHA Final Ruling
and
A Guide to Exterior Building Maintenance

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Presented to:
NCHEA Members
District III
Best Practices: Exterior Building Maintenance

Presented by: John D. McGrath
Window Cleaning

- Recommended Cleaning Frequency:
  - Semi-annually for exterior
  - Annually for interior common areas

- Professional window cleaning maintains the integrity of the glass by keeping mineral deposit staining at bay.

- The aesthetics of clean glass is a secondary benefit.
Window Cleaning

Your Vendor Should...

1. Provide a comprehensive safety program with site specific plans at no cost

2. Recommend an optimal plan for Window Cleaning while working with your budget

3. Be a partner with excellent communication, including: scheduling, daily progress reports, and insight into building conditions

4. Be knowledgeable about industry codes and standards like 1910 Subpart D “Walking-Working Surfaces”
Pressure Washing - Parking Decks

Part parking lot, part building and part bridge; the modern parking garage is like no other structure. These facilities are designed to meet an ever-expanding array of criteria while enduring harsh environmental conditions. They must withstand wide temperature variations and extremely corrosive environments, all while supporting impressive loads.

“Semi-annual cleaning of the decks is an often recommended and much overlooked pro-active approach to garage maintenance. In fact, cleaning is perhaps the most cost-effective method of protecting the garage.”

Excerpt from article, “Parking Structure Maintenance” by Lawrence E. Keenan, P.E.  [Click here](#) to view the article.
Pressure Washing - Parking Decks

• Recommended Cleaning Frequency:
  • **Annually**
    • if the structure is located on the coast (salty air) or if ice melt chemicals are used then **Semi-annually**

• The longer the salt and ice melt products absorb into the structure the more likely that the **chemicals will attack the steel rebar structure** of the deck, causing destructive issues and repair challenges.
Pressure Washing - Building Façade

- Recommended Cleaning Frequency:
  - Once every 5 - 7 years

- Professional pressure washing is a simple way to keep a facility’s façade aesthetically pleasing, while also maintaining its integrity.

- The longer atmospheric pollutants reside on the building façade the more likely it will become deeply stained.

- The 5-7 year rotation is an affordable alternative to the more costly restorative cleaning needed to remove embedded stains.
Pressure Washing - Building Façade

Heavy build-up of mold, mildew, etc. on building façade
Pressure Washing - Building Façade

Removal of build-up is not only aesthetically pleasing but also prevents the need for costly restorative cleaning.
Pressure Washing - Curbs, Sidewalks, Retaining Walls

- Recommended Cleaning Frequency:
  - Annually

- Pressure washing can improve the appearance of a facility tremendously by eliminating unsightly green and black mildew.

- Pressure washing is an affordable way to give patients, visitors, doctors and personnel a good first impression of your facility.
Pressure Washing

Your Vendor Should...

• Provide the latest in pressure washing technology.

• Access hard-to-reach places without compromising safety or efficiency

• Educate facility operators about the safety codes and standards.

• Stay updated with the ever-changing environmental laws
Metal Maintenance

• On-going maintenance programs are necessary for painted and bare metals to protect and prevent permanent damage, staining, and discoloration.

• For efficiency and economy, regular metal maintenance should be integrated with the window cleaning schedule.

Your Vendor Should...

• Conduct exterior building inspections to determine type and condition of metal finishes and glass.

• Conduct detailed test spots at various locations to determine results.

• Provide references regarding past metal maintenance work.

Click here to view the full article.
Best Practices: Exterior Building Repairs

Presented by: Michael MacDonagh V
Maintenance VS Repairs

Maintenance:
• Work completed to prevent deterioration to a property.

Repairs:
• Work completed to fix damage or deterioration of a property.
Repair Items

Basic Repair Items Include:

- Sealants/Caulking
- Vertical Wall Coatings
- Horizontal Coatings
- Expansion Joint Systems
- Masonry Systems
- Below Grade Waterproofing
- Concrete/PreCast
- Window/Panel Gaskets
- Paver and/or Plaza Systems
- Stucco/Dryvit
- Water Repellents
1st Step: Create a Plan

Key Components in Developing Plan:

• Knowing your facade systems
• Identifying repair items
• Identifying system replacement items
  ➢ Consult with experienced façade rehabilitation engineer/architect
• Establishing time frames
• Budgeting
  ➢ Operational VS Capital Expense
• Impact on occupants
2nd Step: Implement Plan

Key Components in Implementing:

- Action plan
- Personnel and responsibilities
- Scheduling and timelines
- Customer care
- Avoiding high cost emergency repairs
3rd Step: Continue Maintenance Plan

Goals:

- Maintaining at lowest possible cost
- Operating with realistic annual budgets
- Evaluating existing conditions
  - Daily/Weekly/Monthly/Annually
- Identifying maintenance, repair and replacement items
SAFETY FIRST on EVERY PROJECT
Fall Protection Overview: Rooftop Safety & Revised OSHA 1910 Subpart D

Presented by:
Travis Nelson, PE, CSP
OSHA 1910 Subpart D Final Ruling

• Falls from heights and on the same level (a working surface) are among the leading causes of serious work-related injuries and deaths.

• In November of 2016, OSHA published the final ruling to Walking-Working Surfaces (1910 Subpart D), to better protect workers in general industry from these hazards by updating and clarifying standards and adding training and inspection requirements.

• These updates effect both Building Owners and Contractors.
OSHA Standards

- 1910.22 – Walking Working Surface Conditions
- 1910.23 - Ladders
- 1910.27 - Scaffold and Rope Decent System
- 1910.28 - Duty to have Fall Protection
- 1910.29 - Fall Protection Systems
- 1910.30 - Training Requirements
- 1910.140 - Personal Fall Protection Systems
- 1910 Subpart I App C – PFPS Guidelines
ANSI Standards

• Voluntary consensus standard but can be incorporated by reference or cited as general duty

• OSHA Memorandum dated 5/21/1991:
  "ANSI will furnish assistance and support and continue to encourage the development of national consensus standards for occupational safety and health issues for the use of OSHA and others."

• Typically more comprehensive than OSHA

• ANSI Z359 will consist of (17) Fall Protection Related Standards
ANSI Z359 Fall Protection Code

- Z359.0-2005 - Definitions & Nomenclature
- Z359.1-2007 - PFAS Subsystems & Components
- Z359.2-2007 - Min Requirements for a Comprehensive Managed Fall Protection Program
- Z359.3-2007 - Positioning & Travel Restraint Systems
- Z359.4-2007 - Assisted Rescue & Self Rescue Systems
- Z359.6-2009 - Specifications & Design Requirements for Active Fall Protection Systems
- Z359.7-2011 - Qualification & Testing of Fall Protection Products
- Z359.11-2014 - Safety Requirements for Full Body Harnesses
- Z359.12-2009 - Connecting Components for Personal Fall Arrest Systems
- Z359.13-2009 - Personal Energy Absorbers and Energy Absorbing Lanyards
- Z359.14-2012 - Self Retracting Devices for PFAS
- Z359.15-2014 - Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
- Z359.16-2016 - Safety Requirements for Climbing Ladder Fall Arrest Systems
What is Fall Protection?

Effective Means to Prevent Injury When Working at Height
When is Fall Protection Required?

• Standards
  • OSHA
  • ANSI
  • Employer/Agency

• OSHA 1910.28 – Duty to Have Fall Protection
  • “Requires employers to provide protection for each employee exposed to fall and falling object hazards.”

• 4ft Trigger Height to Lower Level for General Industry

• Parapet / Railing Height less than 39”

• When Working Over Dangerous Equipment

• Must Consider Trips, Falls at Same Level Regardless of Elevation
How Far From The Building Edge?

• Fall Protection is Required for Travel Within 15ft of the Building Edge.
  
  • “Employer must ensure each employee is protected from falling by using a guardrail system, safety net system, travel restraint system, or personal fall arrest system.”

• OSHA Trained Employees May Work Without Fall Protection When 15ft or More From Building Edge.
  
  • When work is performed 15 feet or more from roof edge, the employer must:
    
    • “Protect each employee from falling by a guardrail system, safety net system, travel restraint system, or personal fall arrest system.”
    
    OR
    
    • “Implement and enforce a work rule prohibiting employees from going within 15 feet of the roof edge without using fall protection.”
How Far From The Building Edge?
Fall Hazard Survey

• ANSI Z359.2

• Identifies Fall Hazards and provides one or more methods to eliminate or control.

• Identifies factors such as the reason for the exposure, possible severity of a fall, maintenance frequency, task duration, environmental conditions, history of incidents.

• Primary Objective: Keep the user from the edge and experiencing a fall event
Hazard Recognition

Open Roof Hatch

Skylights
Hazard Recognition

Security Camera
or
Light
Hazard Recognition

Roof Drains
Hazard Recognition

Gutter Cleaning
Hazard Recognition

HVAC Maintenance
Hazard Recognition

Fixed Ladders & Extension Ladders
Hazard Recognition

Hoisting Tools & Materials to Roof
Hazard Recognition

Walking-Working Surface Conditions
Hierarchy of Fall Protection

• “I have a fall hazard: what do I do about it?”

• Fall Protection Hierarchy
  • Elimination or Substitution
  • Passive Fall Protection
  • Active Fall Protection
    • Travel Restraint
    • Fall Arrest
  • Administrative Controls
Elimination or Substitution

• Changing a process, sequence or procedure so that fall hazard is eliminated

• Often more realistic for interior applications. Relocate components that require maintenance to lower level or to hinge up and down.

• Example: Relocate HVAC units to ground level, relocate valve in ceiling for accessibility from floor level

• Could be a partial elimination – resulting in less frequent access (install products that minimize maintenance)
Passive Fall Protection

• Isolating or separating the hazard or hazardous work practice from employees or others (ANSI)

• Guard rail systems
  • Structure Mounted and Non-Penetrating Options

• Roof hatch guard rail systems

• Skylight screens or Guardrail Systems
Roof Edge Guard Rail Systems

- OSHA 1910.29(b)
  - Top rail 39-45 inches high (~42in)
  - Midrail installed midway between top rail and walking-working surface
  - Withstand 200lb force in any direction
  - Not deflect past 39 inch min height with force

- ANSI 1264.1-2007 5.6
  - Withstand 200lb force in any direction
  - Not exceed 3 inch max deflection at any point

- Roof, sidewall, parapet install

- Ballasted non-penetrating system an option
Guardrail Systems

• Ballasted, Non-Penetrating, Systems
Guardrail Systems

• Structure Mounted Railing
Hatch Guardrail Systems

- OSHA 1910.28(b)(3)(iv) – “Each employee is protected from falling into a ladderway floor hole or ladderway platform hole by a guardrail system...”
Skylight Fall Protection

- OSHA 1910.28(b)(3)(i) – “Each employee is protected from fall through any hole (including skylights) that is 4 feet or more above a lower level...”
Active Fall Protection

• **Travel Restraint**
  • Secured to anchorage so that users center of gravity (torso) will not reach fall hazard
    • Requires anchorage and properly sized lanyard
    • Must maintain minimum safety factor of 2:1 (400 lb min rated load)
  • Limited to low slope areas not to exceed 4:12
  • Permanently Installed Travel Restraint Systems are to be Designed for Fall Arrest per ANSI Z359.6

• **Fall Arrest**
  • Designed to stop user after a fall has begun
    • Must maintain minimum safety factor of 2:1 (900 lb min rated load)
    • Clearance and rescue considerations
Travel Restraint

• Design to prevent fall over edge
• Anchors/lifeline properly placed
• Properly sized lanyard
• Force on users’ body should not be > 400lbs
Fall Arrest

- Designed to arrest user in the event of a fall
- Rescue plan is required – See Safety & Health Information Bulletin “Suspension Trauma/Orthostatic Intolerance”
- Anchor spacing to prevent swing falls
- Properly sized lanyard
- Shock Absorber (MAF)
Horizontal Lifeline System

- Provides continuous access along building edge
Horizontal Lifelines

• Travel restraint or fall arrest applications. Designed to allow work in travel restraint but with load capacity to arrest user’s fall.

• Uses single point anchors for anchorage of wire rope.

• Minimum 2:1 Safety Factor Required.

• Personal Energy Absorber vs Horizontal Lifeline Energy Absorber.

• Allows User to Work Perpendicular from Point of Anchorage, Minimizing Swing Fall Hazard which can occur near corners, L-shapes.
Administrative Controls

- Influencing the way people work by developing safe work practices

- Procedures that signal or warn user to avoid approaching fall hazard

- Documented training and retraining is essential
Administrative Controls

• OSHA 1910.30(a)(1) – Fall Hazard Training Requirements

  • “Before any employee is exposed to a fall hazard, the employer must provide training for each employee who uses personal fall protection systems...Employers must ensure employees are trained on or before May 17, 2017.”

  • “The employer must provide information and training to each employee in a manner that the employee understands.”
Blend Solutions When Necessary
ABC’s of Fall Protection

• Anchorage
  • Certified point of attachment. Only as designated.
  • Horizontal Lifeline systems designed to support multiple users.
  • Single point anchors are designed for single user connection.
Single Point Roof Anchors
Structure Mount

Concrete Mount Anchor

Bolt Through Anchor

Beam Wrap Anchor

Joist Wrap Anchor
Single Point Anchors
Structural Mount

Concrete Wall Mount Anchor

Weldable Wall Anchor
ABC’s of Fall Protection

• Body Support
  • Full body harnesses are required when using these systems. Full body harnesses are designed to arrest vertical freefall by distributing fall forces throughout the body with concentrated load to hips.
  • Harness shall provide support across the lower chest, over the shoulders, and around the thighs.
  • Fall arrest attachment shall be located on the back (dorsal) position.
ABC’s of Fall Protection

• Connector

• Lanyards:
  • Fixed length lifelines that limits users’ mobility/reach

• Self Retracting Lifelines (SRL):
  • Contain drum-wound line that can be slowly extracted or retracted during normal movement.

• Connector should be carefully selected as designated to prevent edge access (Travel Restraint)
Anchor Layout and Placement

- No “One Size Fits All” Solution

- Gutter Cleaning vs Security Camera at Corner

- Number of System Users & Level of Training

- Continuous Travel vs Double Leg Lanyard Horizontal Lifeline Systems

- Bid drawings: Confusion when locations are not shown (delegated design)
Anchorage Layout Example 1
Anchorage Layout Example 2
RDS Suspended Access Anchorage System

• OSHA 1910.27(b)(1)(i):

  • “Certifying permanent anchorages for RDS: **Nov. 20, 2017** Before any rope descent system is used, the building owner must inform the employer, **in writing** that the building owner has **identified, tested, certified**, and maintained each anchorage so it is capable of supporting at least **5,000 pounds**, in any direction, for each employee attached. The information must be based on **an annual inspection** by a qualified person and **certification of each anchorage** by a qualified person, as necessary, and **at least every 10 years**.”

• Compliance date for Inspecting and
RDS Suspended Access Anchorage System

• OSHA 1910.27(b)(2)(v)

• “The rope decent system has proper rigging, including anchorages and tiebacks, with particular emphasis on providing tiebacks when counterweights, cornice hooks, or similar non-permanent anchorages are used.”
Ladder Safety

• 1910.28(b)(9)(i) – Fixed Ladder Over 24 Feet

  • New fixed ladders must be equipped with a personal fall arrest system or ladder safety system.

  • When a fixed ladder, cage or well, or any portion of a section thereof, is replaced, a personal fall arrest system or ladder safety system is installed...

  • Existing fixed ladders are grandfathered in as long as they have an existing cage or well.

    • Compliance date: **Nov. 19, 2018** (New and replacement ladders without any fall protection)

    • Compliance date: **Nov. 18, 2036** (All fixed ladders over 24 Feet)
Walking-Working Surface Conditions

• 1910.22(d): Inspection, Maintenance, and Repair

  • “Walking – working surfaces are inspected, regularly and as necessary, and maintained in a safe condition.”

  • “Hazardous conditions on walking-working surfaces are corrected or repaired before an employee uses the walking-working surface again. If the correction or repair cannot be made immediately, the hazard must be guarded to prevent employees from using the walking-working surface until the hazard is corrected or repaired.”
Resources

• OSHA: https://www.osha.gov/walking-working-surfaces/index.html

• BOMA: http://www.boma.org/industry-issues/building-codes/Pages/Fall-Protection-Systems.aspx
