



# 31st Annual State Construction Conference

March 22nd, 2012

## SCO Inspections “Typical Observations” - Construction Management Section -

Todd Manning, P.E.

# SCO Inspections “Typical Observations”

## Construction Management Section:

Todd Manning, PE – Interim Assistant Director

Joe Baden, PE

Clyde Carl

Doug Edwards

Kernel Green

Kenny Hunt

Steve Lipke

Tim Norman

Gary Rogers

Jerry Rogers

Tom Roberts

Armin Wallner

Ross Wood

# SCO Inspections “Typical Observations”

## Construction Management Section:

**NORTH CAROLINA**  
*Department of Administration*

STATE CONSTRUCTION OFFICE

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NCDOA Home : State Construction Office

### Welcome to the State Construction Office



The purpose of the State Construction Office is to provide professional architectural and engineering services and management leadership to state agencies. This office carries out its responsibility by (1) processing cost estimates and contracts relating to construction or renovation of state buildings; (2) review and approval of all plans and specifications for the construction or renovation of state buildings; (3) supervision of the letting of all contracts for the design, construction or renovation of state buildings; (4) inspection and acceptance of all work done and materials used in the construction of state buildings; (5) conducting assessments of state buildings; (6) providing administrative and technical support to the State Building Commission. These services protect the interest of the state and ensure the proper expenditure of public funds for the citizens of North Carolina.

Follow us: 

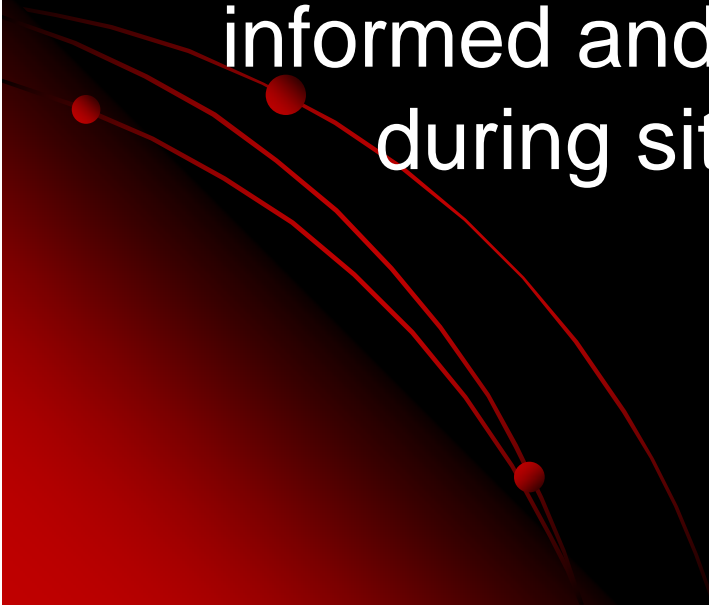
#### Quick Links

- 31st Annual State Construction Conference - March 22, 2012.**
  - To view the agenda, [click here](#). (pdf)
  - To register by mail, [click here](#). (pdf)
  - To register online, [click here](#). (url)
  - To view HUB Expo information, [click here](#). (pdf)
- InterScope** (Agencies, Designers, Contractors)
- VendorLink** (Interactive Purchasing System)

# SCO Inspections “Typical Observations”

Purpose:

Provide examples so everyone is more informed and aware of deficiencies found during site visits and inspections.




# SCO Inspections

## “Typical Observations”


Disclaimer:

The following pictures/examples are not intended to find fault with any individual, design firm or contractor and are only presented for information to provide awareness of common deficiencies found during courtesy site visits and final inspections.



# SCO Inspections “Typical Observations”


Topics:

- Building Envelope
  - Building Interior
  - Steel
  - Egress Paths
- 

# SCO Inspections

## “Typical Observations”

Topics (cont'd):

- Mechanical Systems
  - Sprinkler Systems
  - Fire Alarm Devices
  - Electrical Systems
- 

# Building Envelope

## Masonry

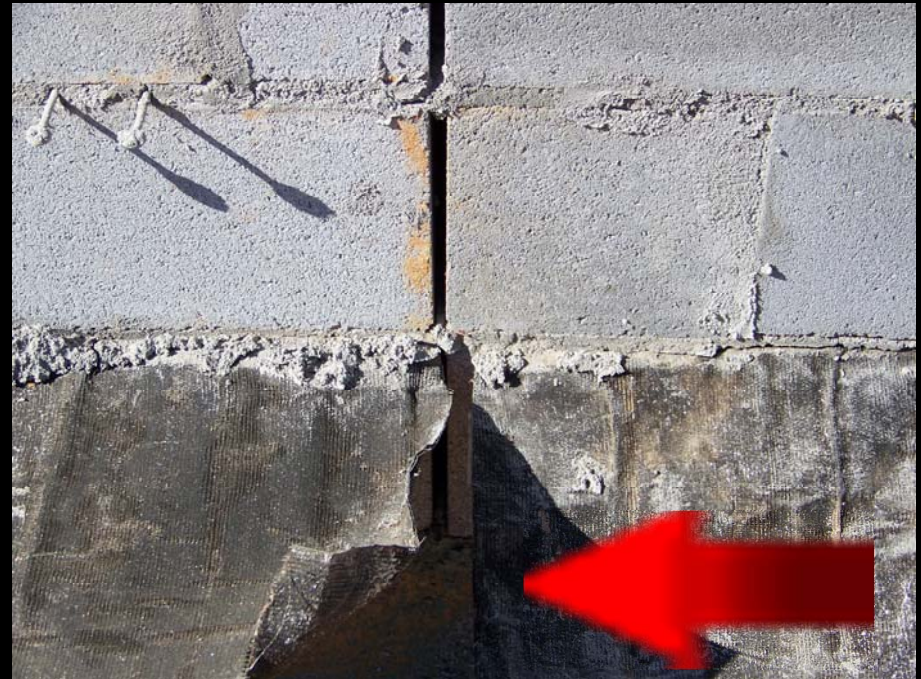
(Protection from mortar bridging)





# Building Envelope

## Masonry (Flashing)



# Building Envelope

## Roof

(Protection of Roof Membrane from Construction Debris)



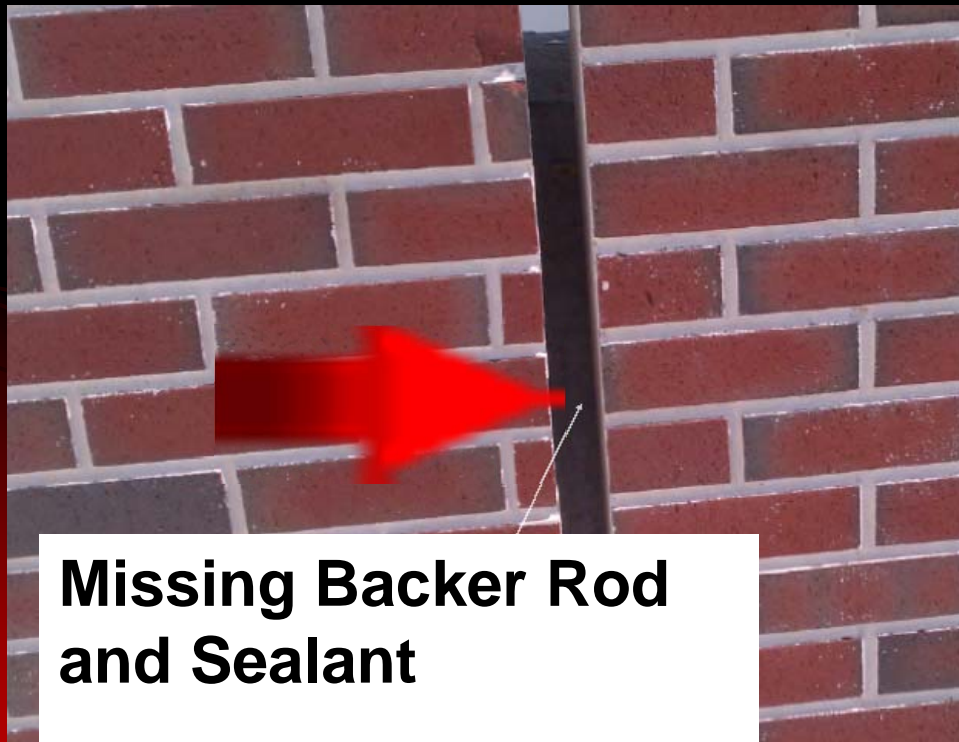
# Building Envelope

Roof  
(Sealant)



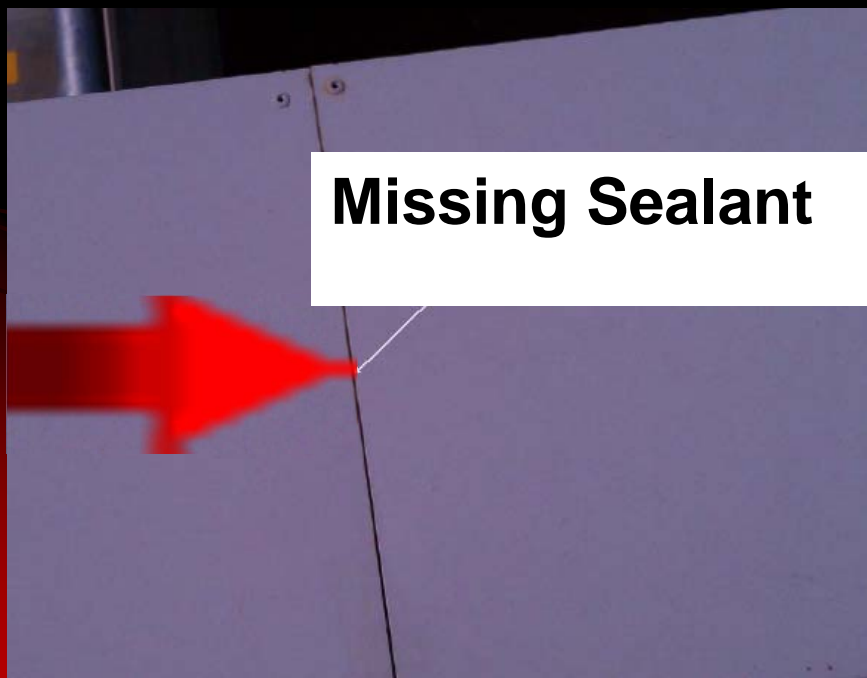
# Building Envelope

## Roof (Sealants)



# Building Envelope

## Roof (Sealants)



# Building Envelope

## Roof (Flashing)



# Building Envelope

## Roof

(Does Termination Bar Seal End from Infiltration?)



# Building Envelope

Roof

(This Side Down?)





# Building Envelope

Roof  
(Patches)



# Building Envelope

## Roof

(Proper Size of Vent Cones)



# Building Envelope

Windows  
(Sealing Window Openings)



# Building Envelope

Windows  
(Sealing Window Openings)



# Building Envelope

Windows  
(Sealing Window Openings)



# Building Envelope

## Curtainwall (ASTM Leak Test)



# Building Envelope

## Doors (Sealing Openings)



# Building Site

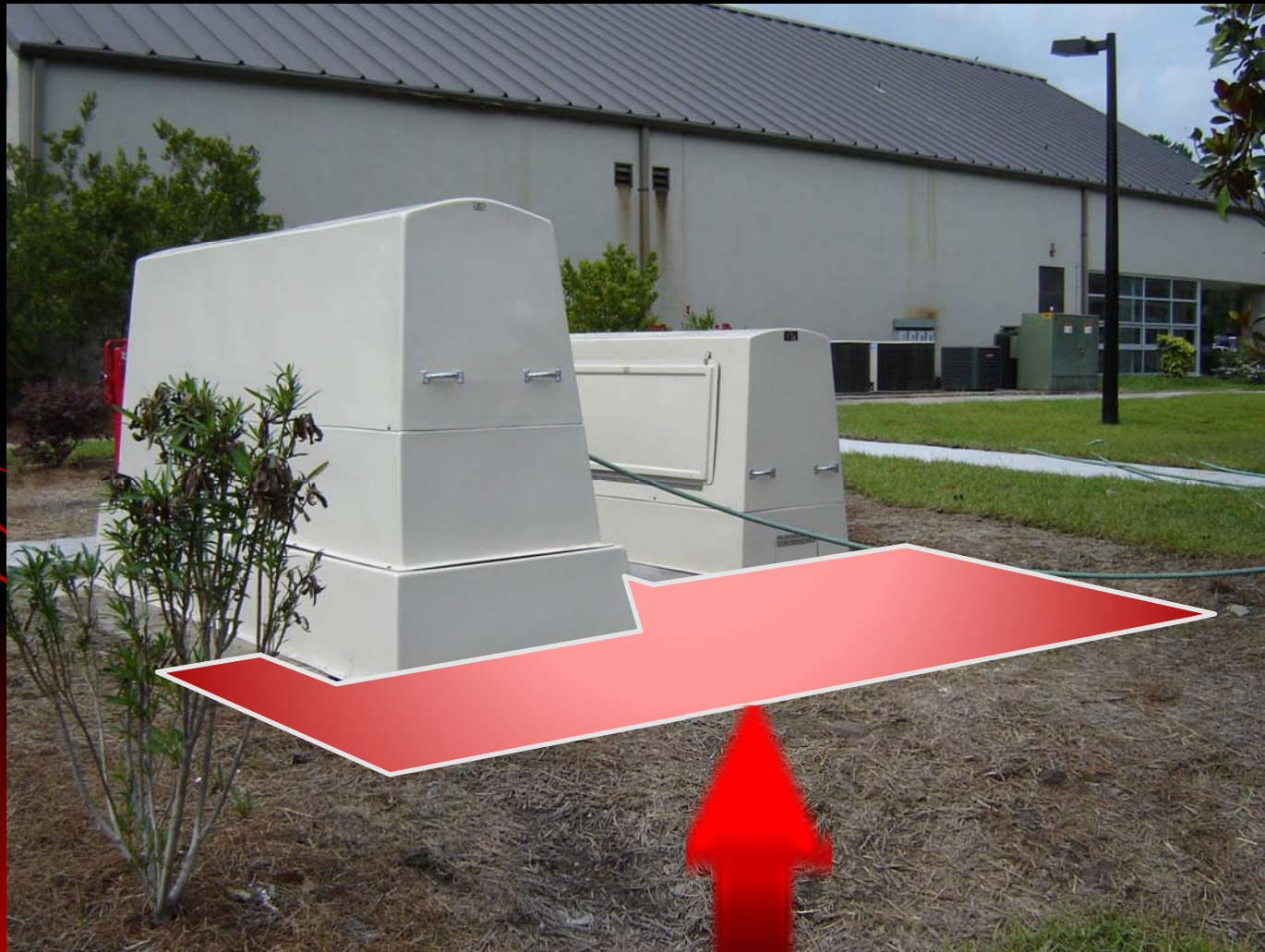
Roadways  
(Elevations/Drainage)





# Building Site

Equipment Pads  
(Support/Rodents)



# Building Materials

Stored Materials  
(Properly Stored?)



# Building Interior

Protection of Sheetrock  
(Water Damage/Potential Mold)



# Building Steel

Steel  
(Fireproofing)



# Egress Path

## Stairwells

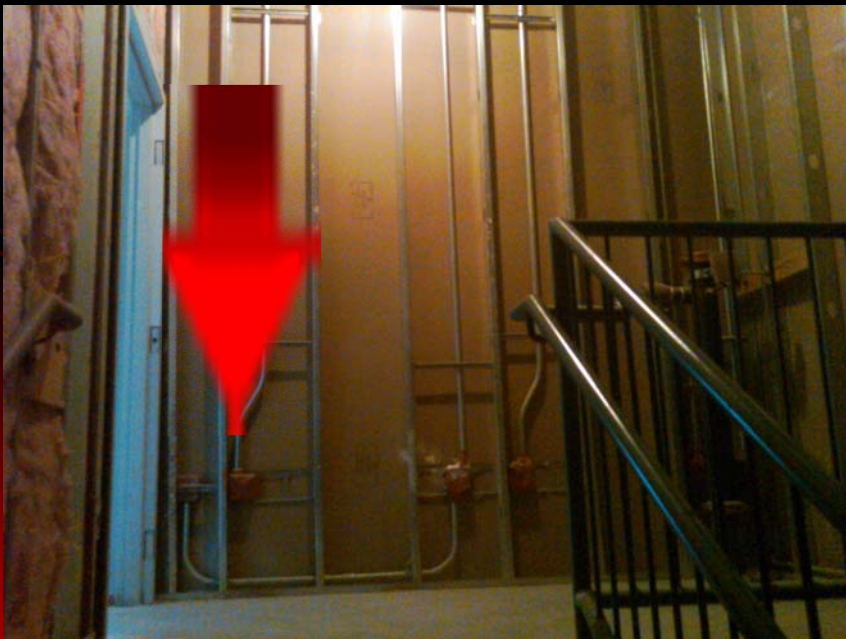
(Protection of the rated membrane)



# Egress Path

## Stairwells

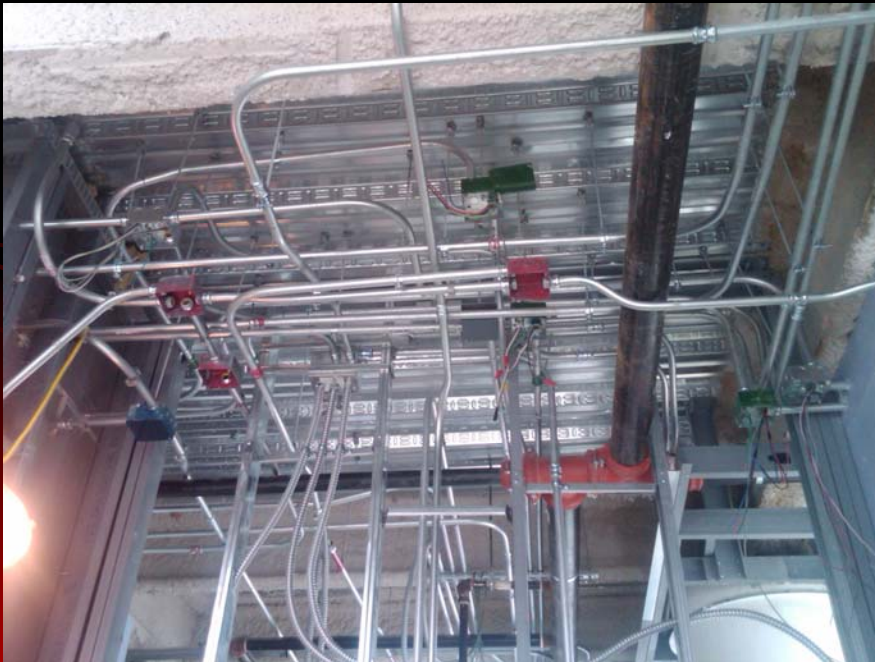
(Protection of the rated membrane)



# Egress Path

## Stairwells

(Protection of the rated membrane)



# Egress Path

## Stairwells

(Protection of the rated membrane)





# Egress Path

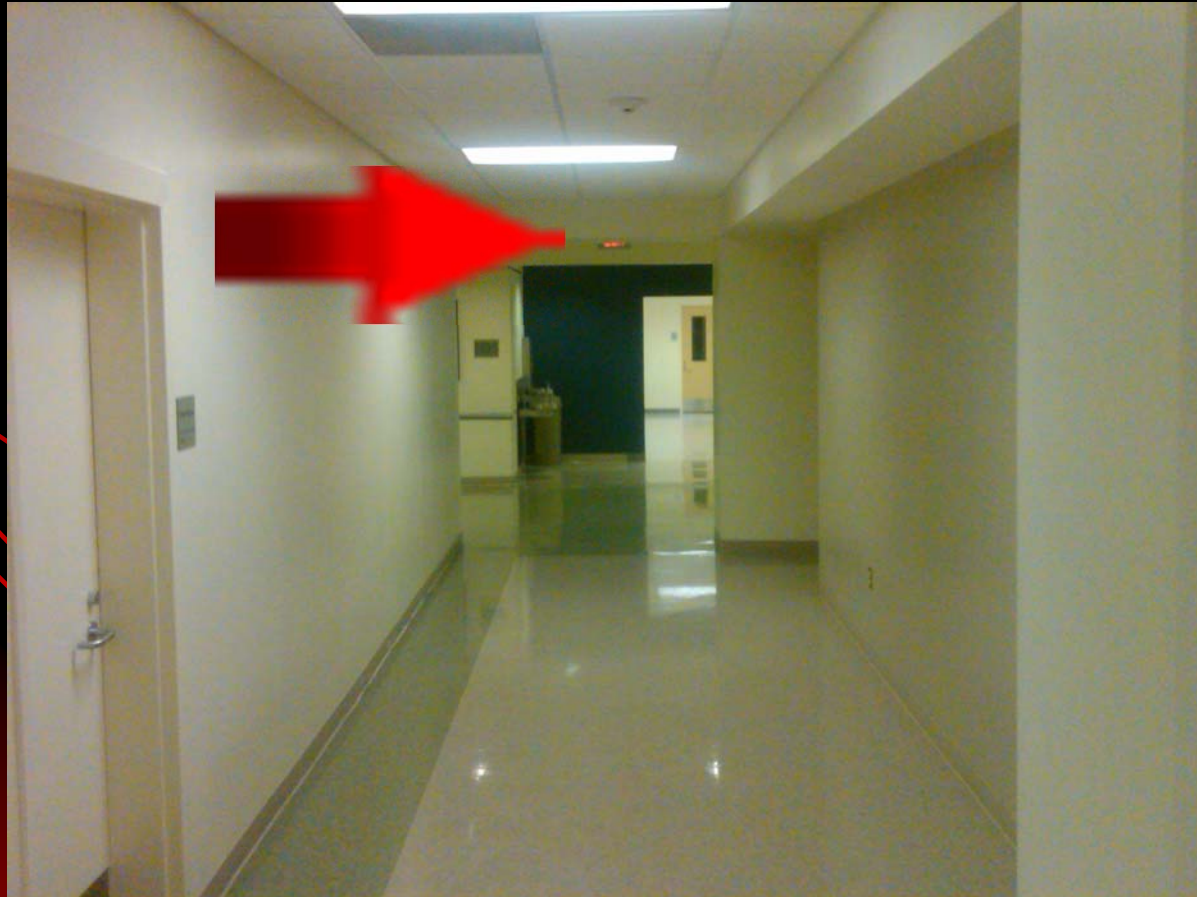
Exit Signs  
(Locations)



# Egress Path

Exit Signs

(Locations – Signage Blocked)



# Egress Path

## Exterior Lighting

(Two Bulbs Required on Emergency Power)



# Interior

## Rated Walls (Protection of Openings)



# Interior

## Rated Walls

(Do Not Compromise the Membrane)



# Interior

## Rated Walls

(Do Not Compromise the Membrane)



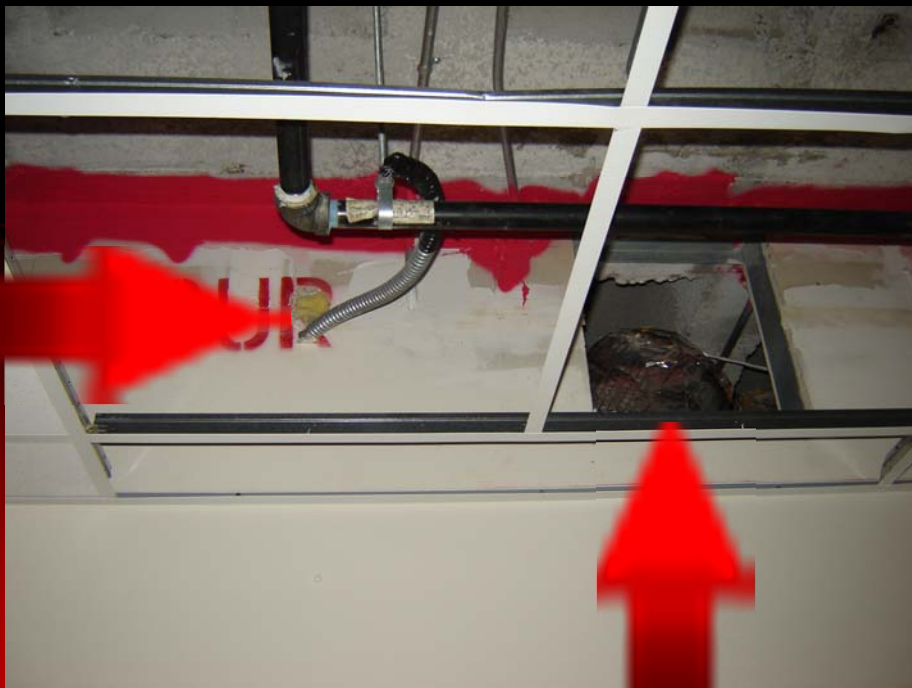
# Interior

Rated Walls  
(Protect all Openings)



# Interior

Rated Walls  
(Protect all Openings)





# Interior

Rated Walls  
(Protect all Openings)



# Interior

Protection of Interior Walls  
(Back Splash to Protect Drywall)



# Mechanical Systems

Fire Dampers  
(Unable to Close Properly)



# Mechanical Systems

## Fire Dampers (Rated Wall)



# Mechanical Systems

Duct Detectors  
(Access Doors ?)



# Mechanical Systems

## Mechanical Equipment Supports (???)



# Mechanical Systems

## Mechanical Ductwork Support (???)



# Mechanical Systems

## Mechanical Ductwork Support (Restricted Air Flow)





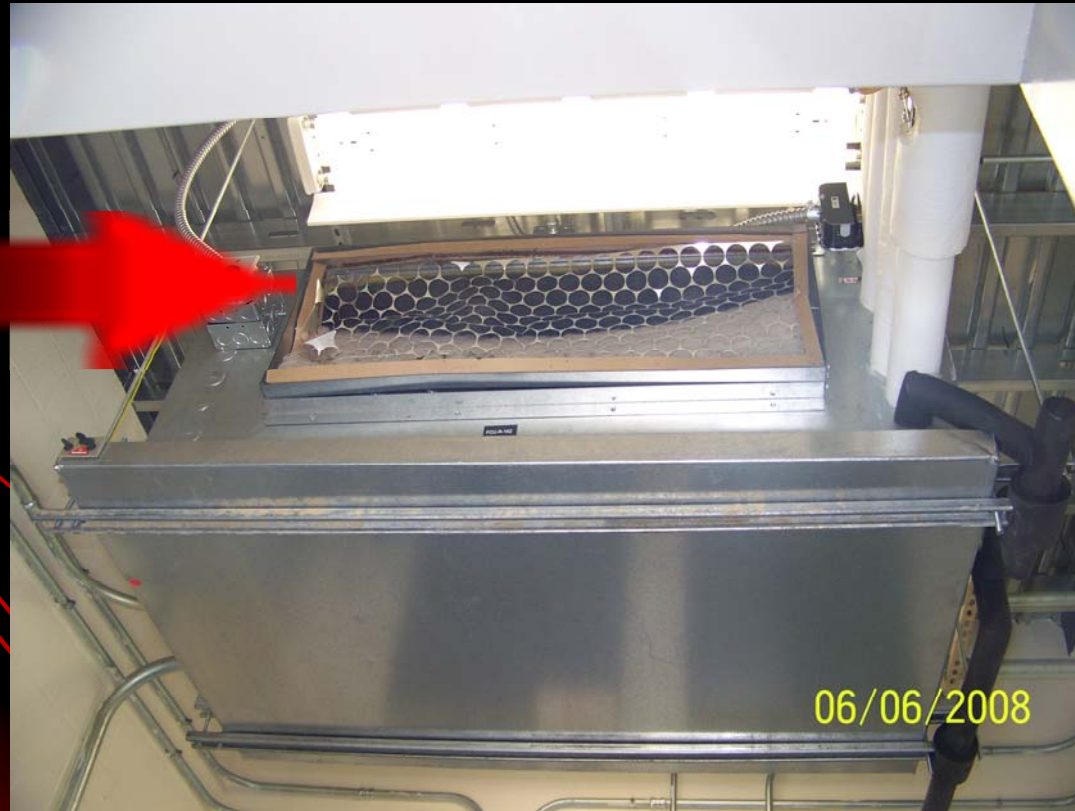
# Mechanical Systems

## Plumbing (Dissimilar Metals)



# Mechanical Systems

## Air Handling Unit (Filters)



# Mechanical Systems

## Air Handling Unit (Filters)



# Mechanical Systems

## Mechanical Piping (Welds)



# Mechanical Systems

Mechanical Piping/Valves  
(Storage/Protection)



# Mechanical Systems

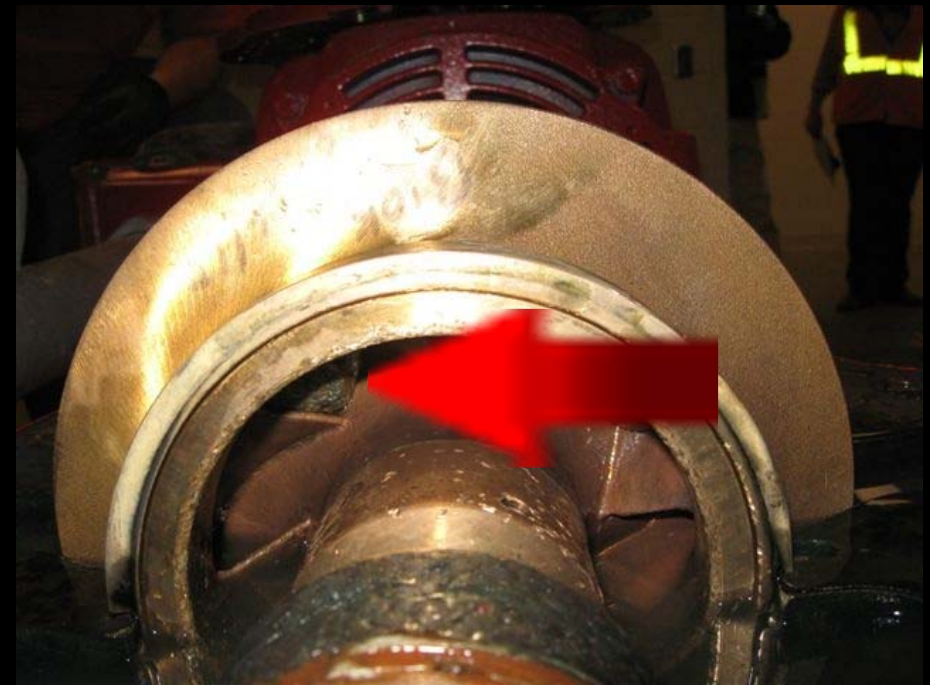
Tanks  
(Venting)



# Sprinkler Systems

## Fire Pumps

(Flushing/Start-up Strainers/Pipe Debris)



# Sprinkler Systems

## Fire Pump Controllers

(Clearance/  
Height)





# Sprinkler Systems

## Flex Head Hoses

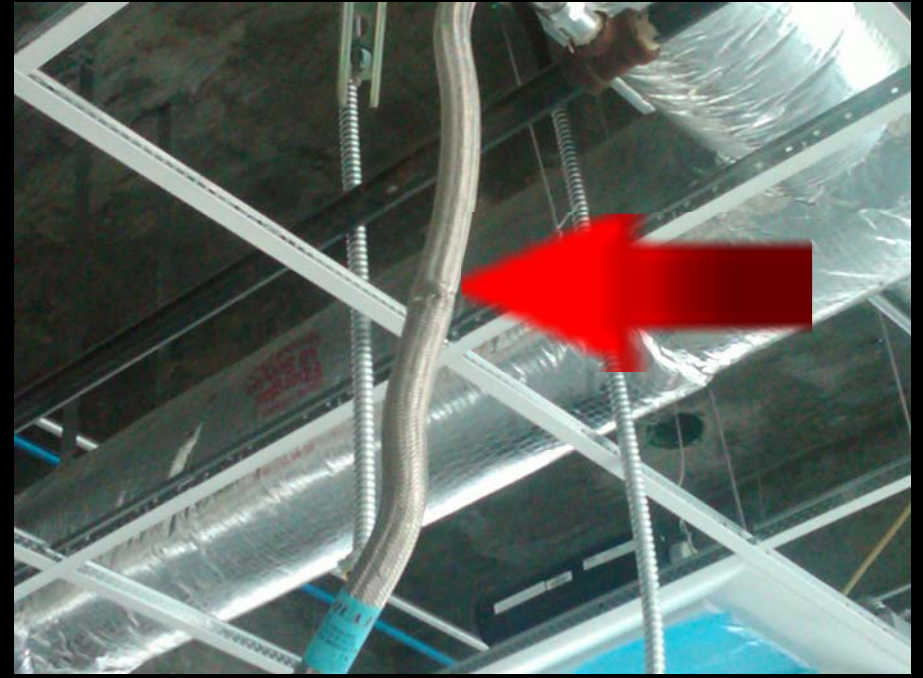
(Corrugated Hoses not allowed per Guidelines)



# Sprinkler Systems

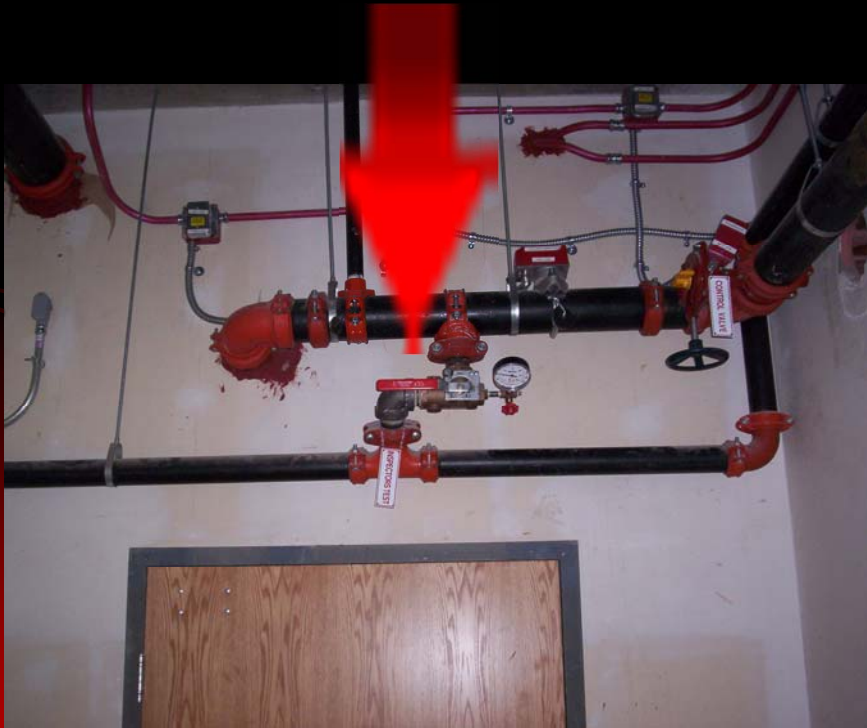
## Flex Head Hoses

(Braided Hoses can be damaged during installation)



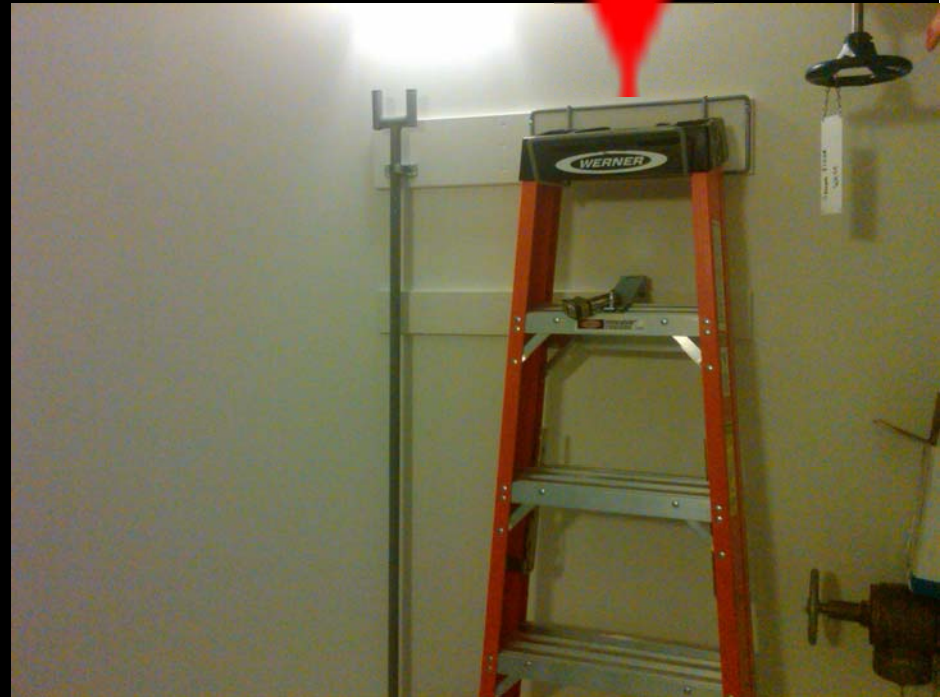
# Sprinkler Systems

Inspector Test Locations  
(Accessible)



# Sprinkler Systems

Inspector Test Locations  
(Accessible)



# Sprinkler Systems

Fire Protection Piping  
(Protection)



# Sprinkler Systems

Fire Protection Piping  
(Protection – Bollards?)



# Fire Alarm Systems

## Fire Alarm Devices

(Smoke Detectors minimum 3 ft. from air distribution)

(Pull stations shall be red)



# Fire Alarm Systems

Fire Alarm Devices  
(Smoke Detector Covers)





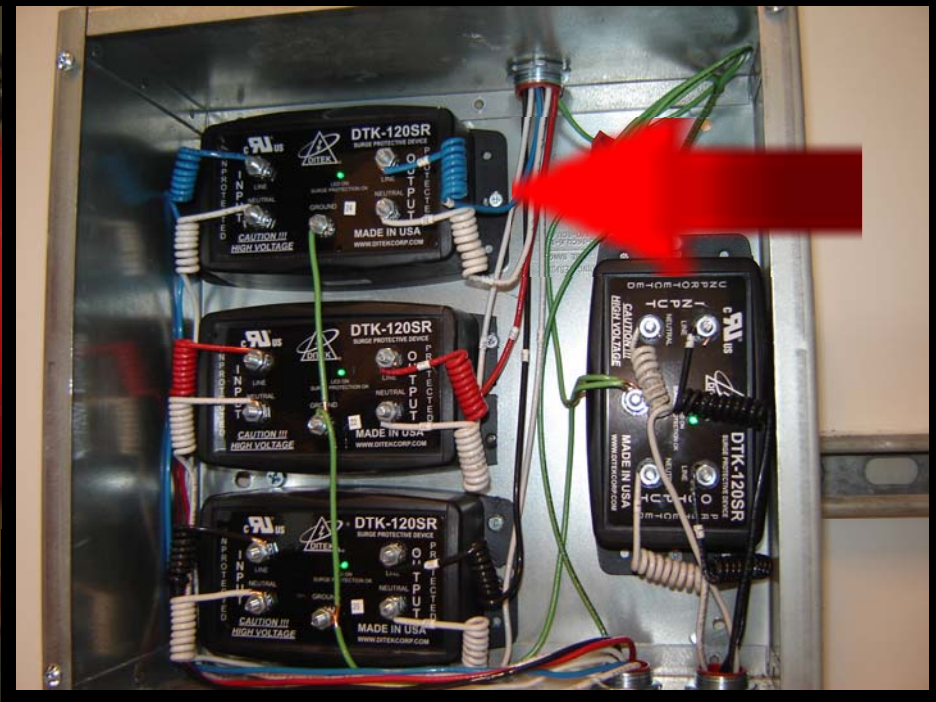
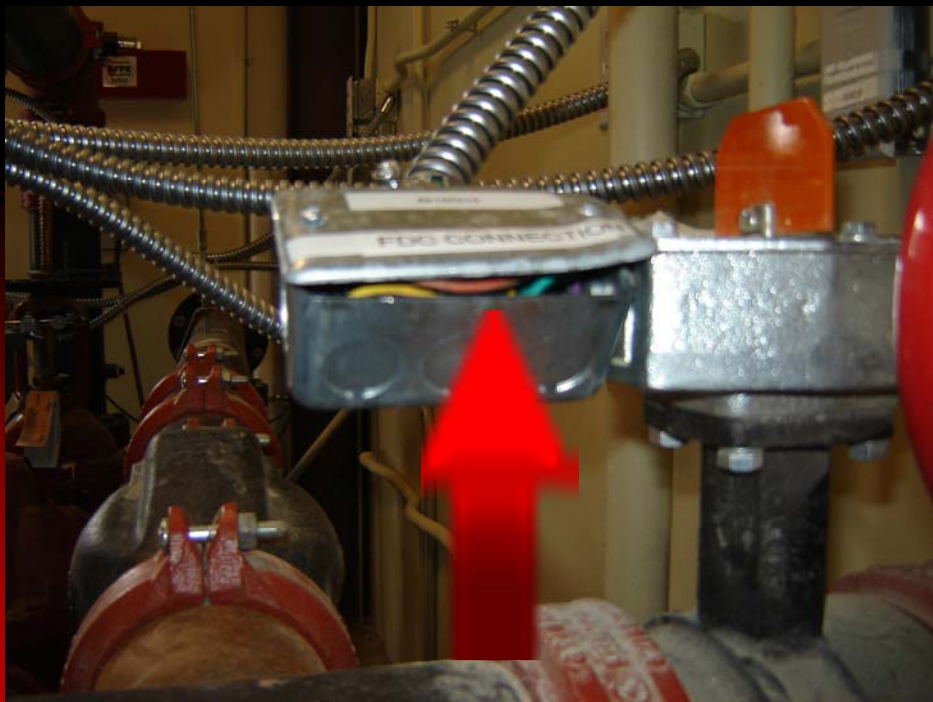
# Fire Alarm Systems

## Fire Alarm Devices (Notification Appliance Settings)



# Fire Alarm Systems

## Fire Alarm Systems (Fire Alarm Wiring)



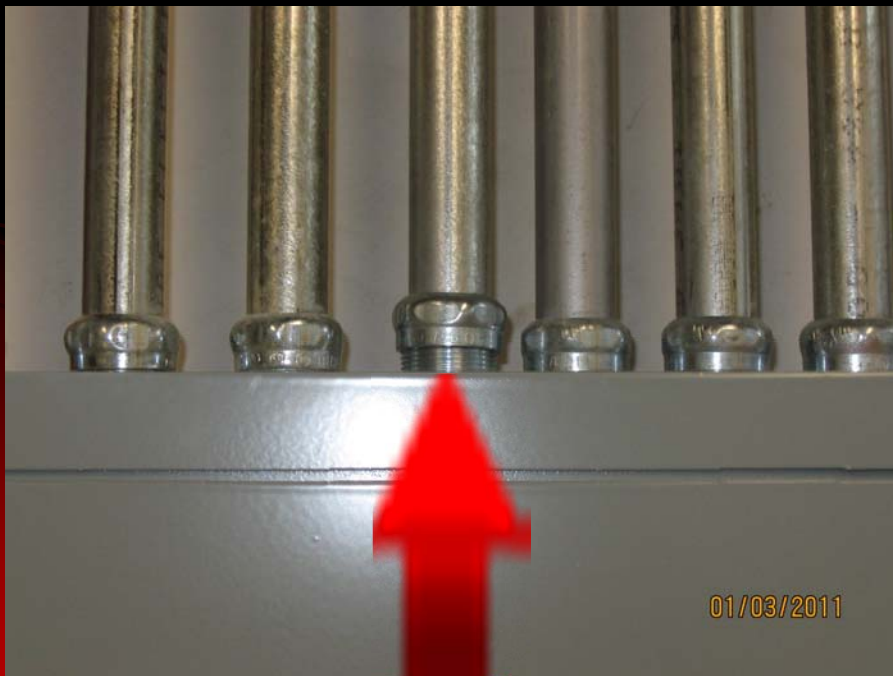
# Electrical Systems

## Conduit (Supports)



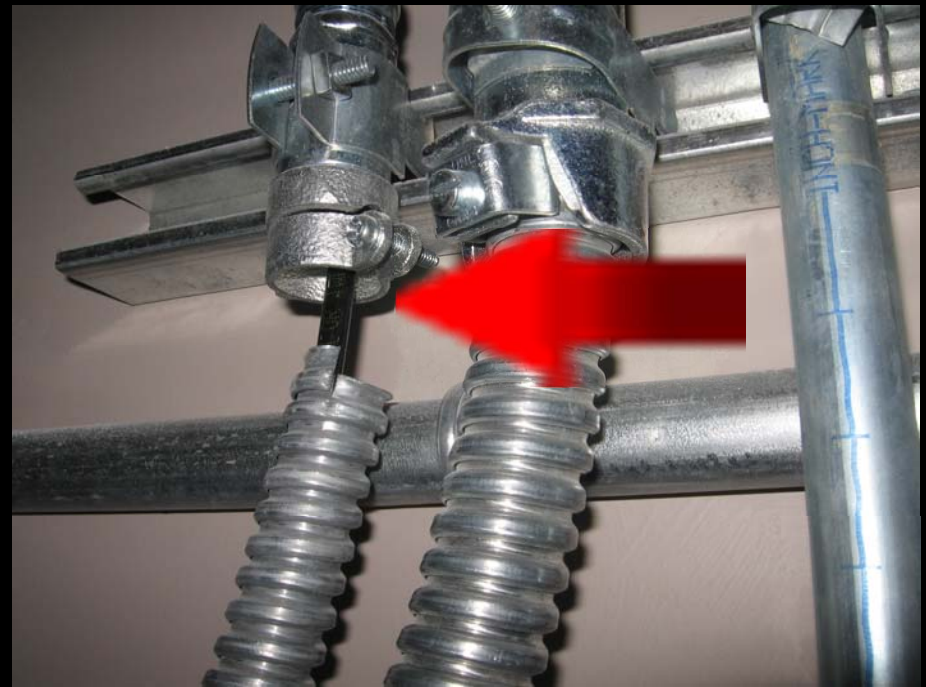
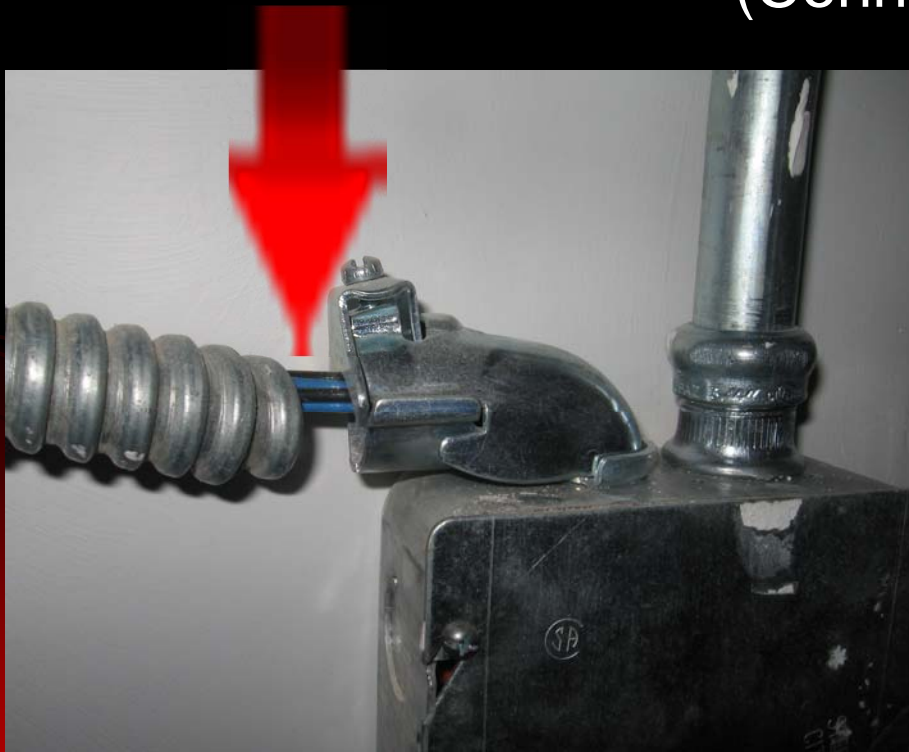
# Electrical Systems

## Conduit (Connections)



# Electrical Systems

## Conduit (Connections)



# Electrical Systems

## Conduit (Routing)



# Electrical Systems

Conduit  
(Routing)



# Electrical Systems

Conduit  
(Supports)





# Electrical Systems

Conduit  
(Supports)



# Electrical Systems

## Conduit (Supports)



# Electrical Systems

## Conduit

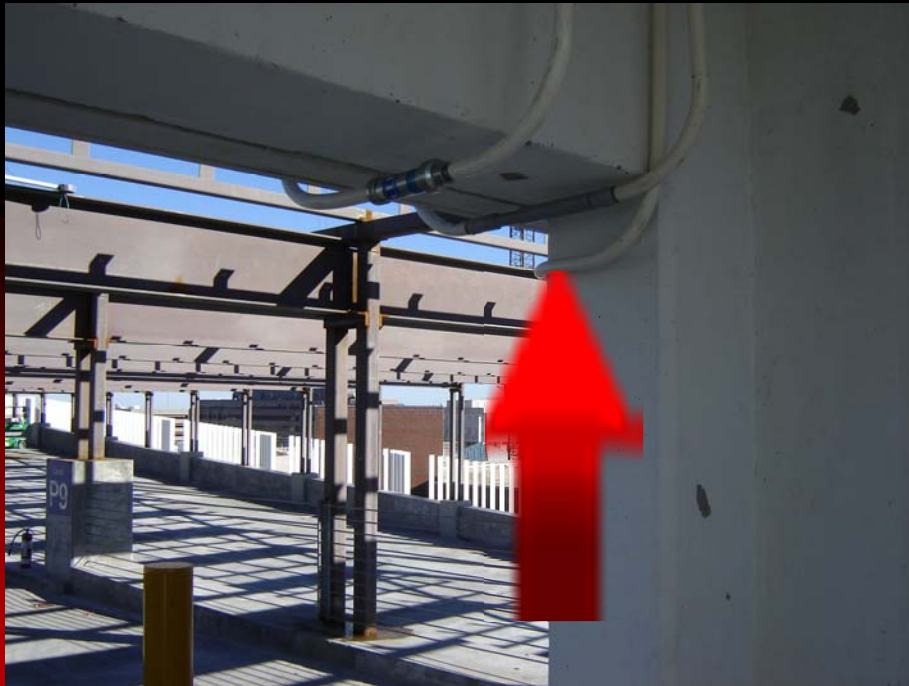
(Expansion Couplings Required at Expansion Joints)



# Electrical Systems

## Conduit

(Expansion Couplings Required at Expansion Joints)



# Electrical Systems

## Exit Signage

(Signage installed without proper backing)



# Electrical Systems

## Conduit

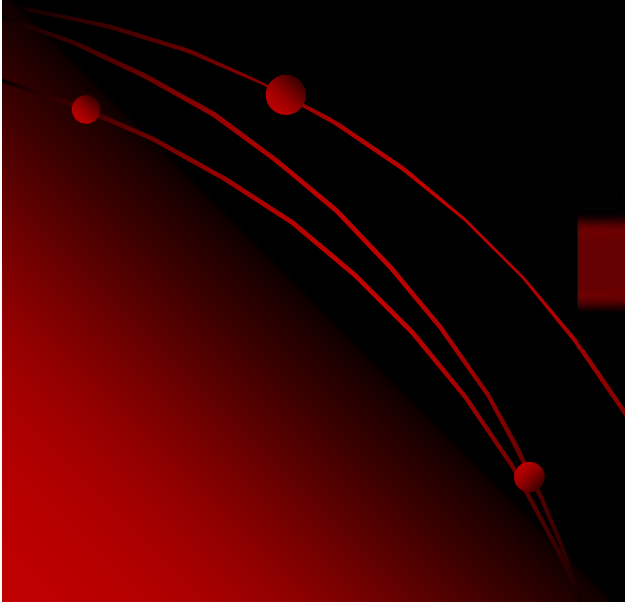
(Protection of Infrastructure)



# Electrical Systems

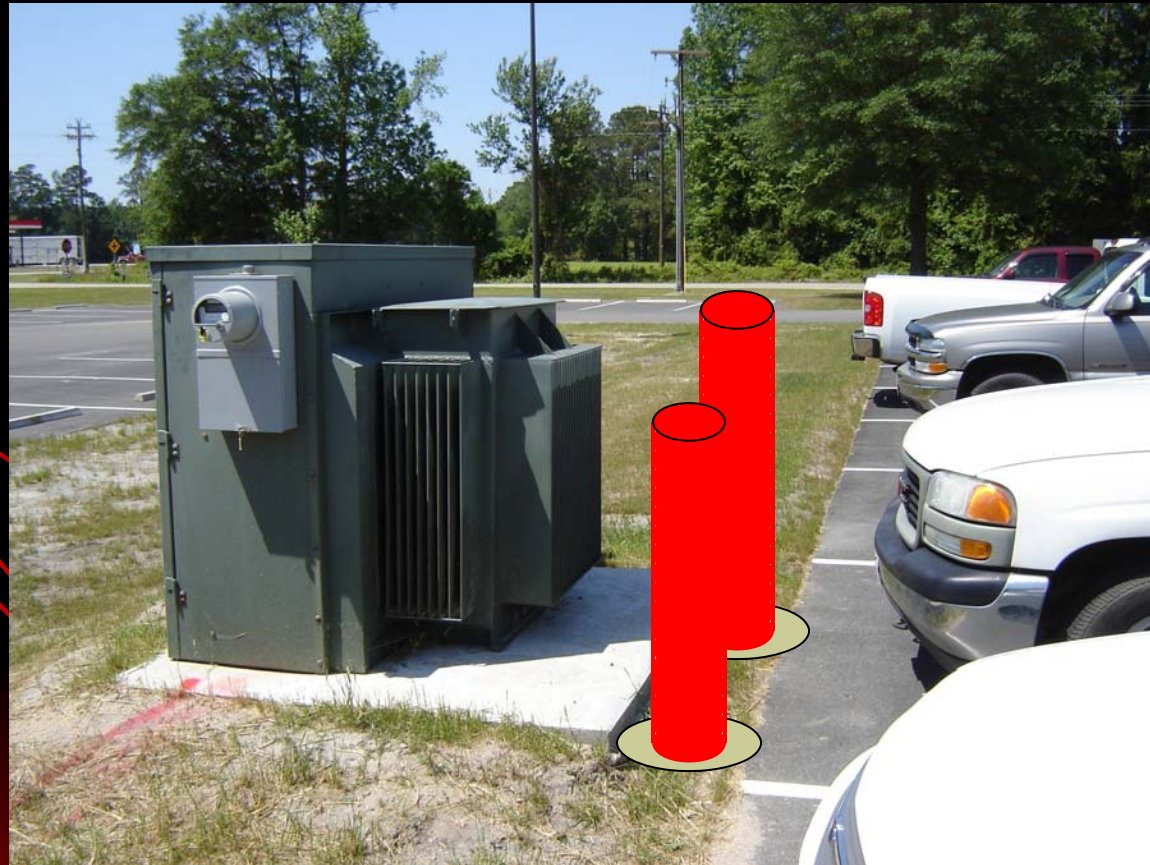
## Conduit

(Protection of Infrastructure)



# Electrical Systems

## Equipment (Protection of Equipment)





# Electrical Systems

## Equipment (Equipment Access)



# Electrical Systems

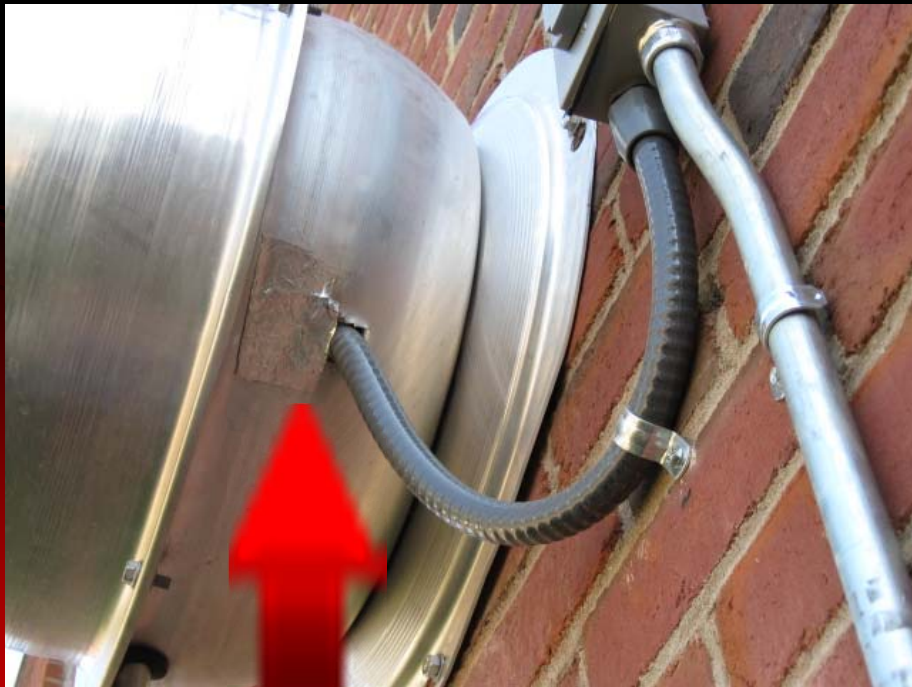
## Equipment

(Un-Mounted Electric Heater in Water - Shock Hazard?)



# Electrical Systems

## Conduit (Equipment terminations)



# Electrical Systems

## Exterior Electrical Devices (Water Tight?)



# Electrical Systems

Exterior Electrical Devices  
(Water Tight?)



# Electrical Systems

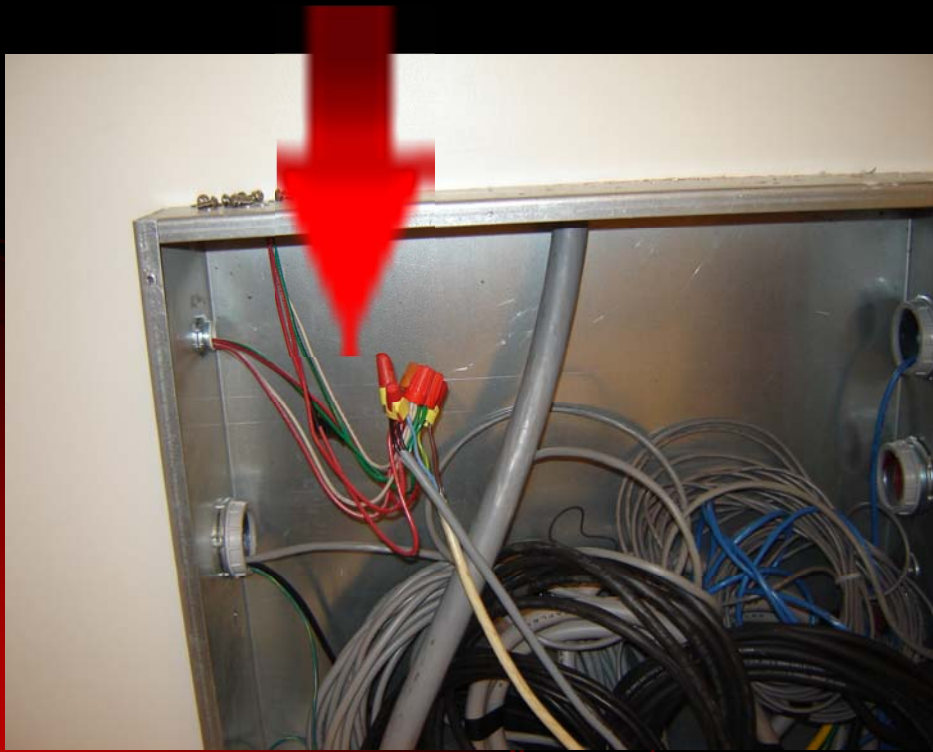
## Exterior Electrical Conduit

*(Electrical Metallic Tubing - EMT?)*



# Electrical Systems

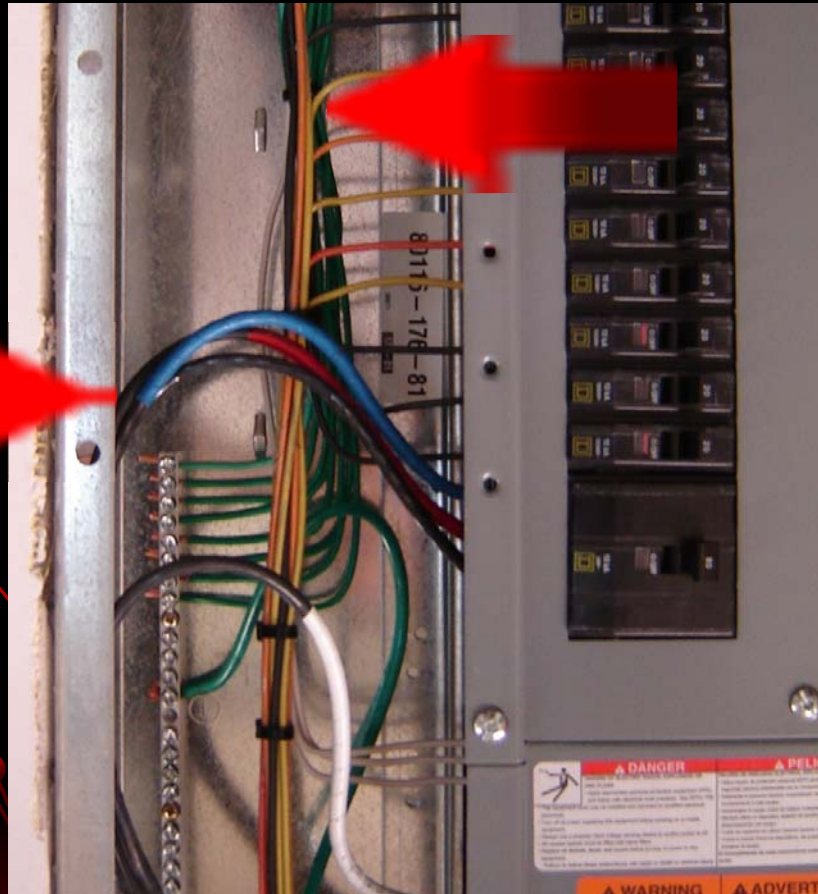
## Wiring (Separation of Cabling)



# Electrical Systems

## Wiring

(Color Coding Designation Confusing 120V or 277V?)







# Electrical Systems

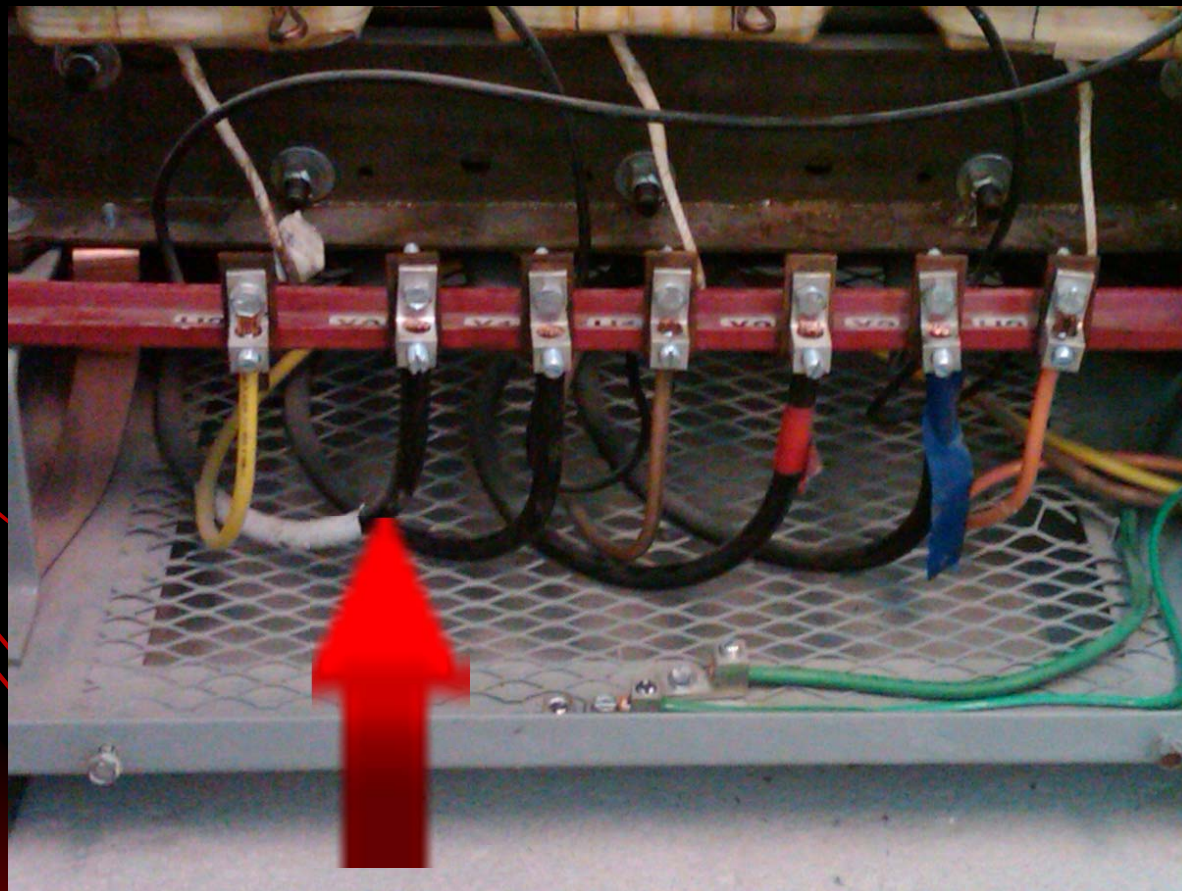
## Wiring

(Strap Does not Bond XO)



# Electrical Systems

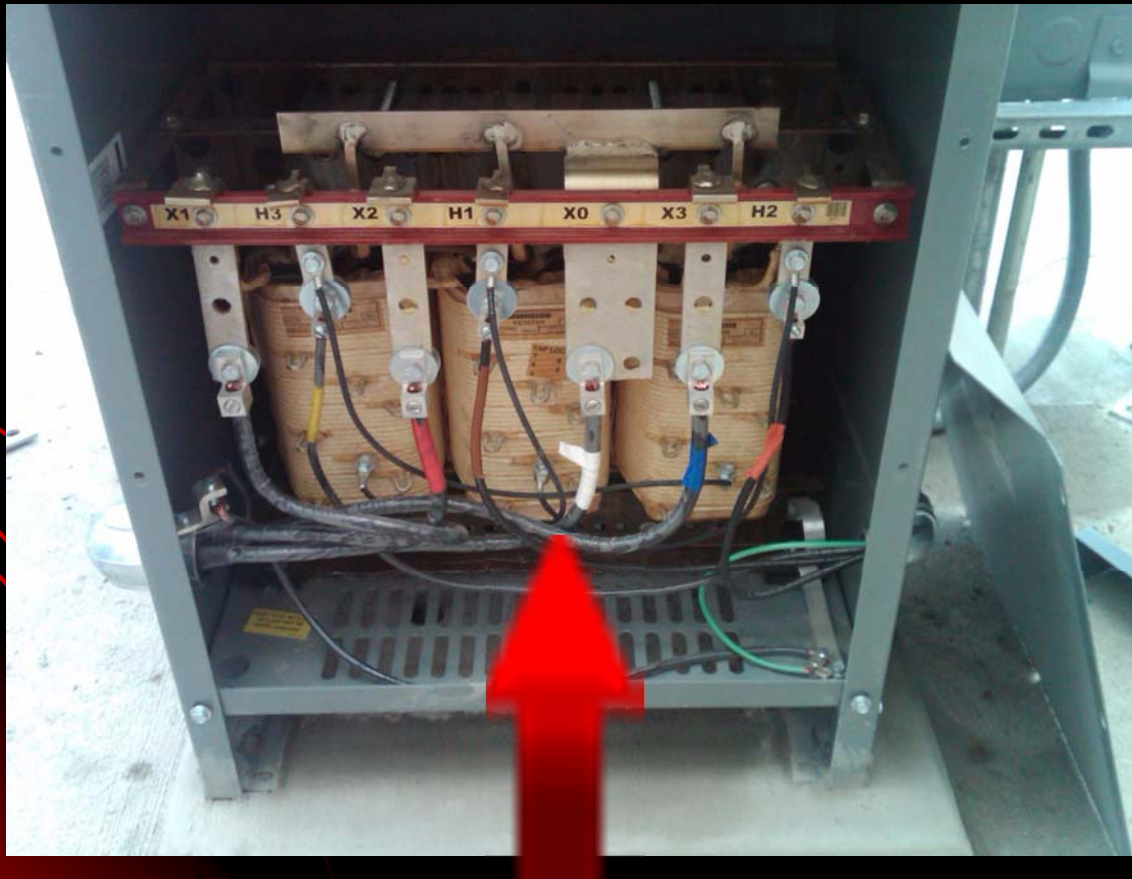
Wiring  
(XO Missing Bonding Jumper)



# Electrical Systems

## Wiring

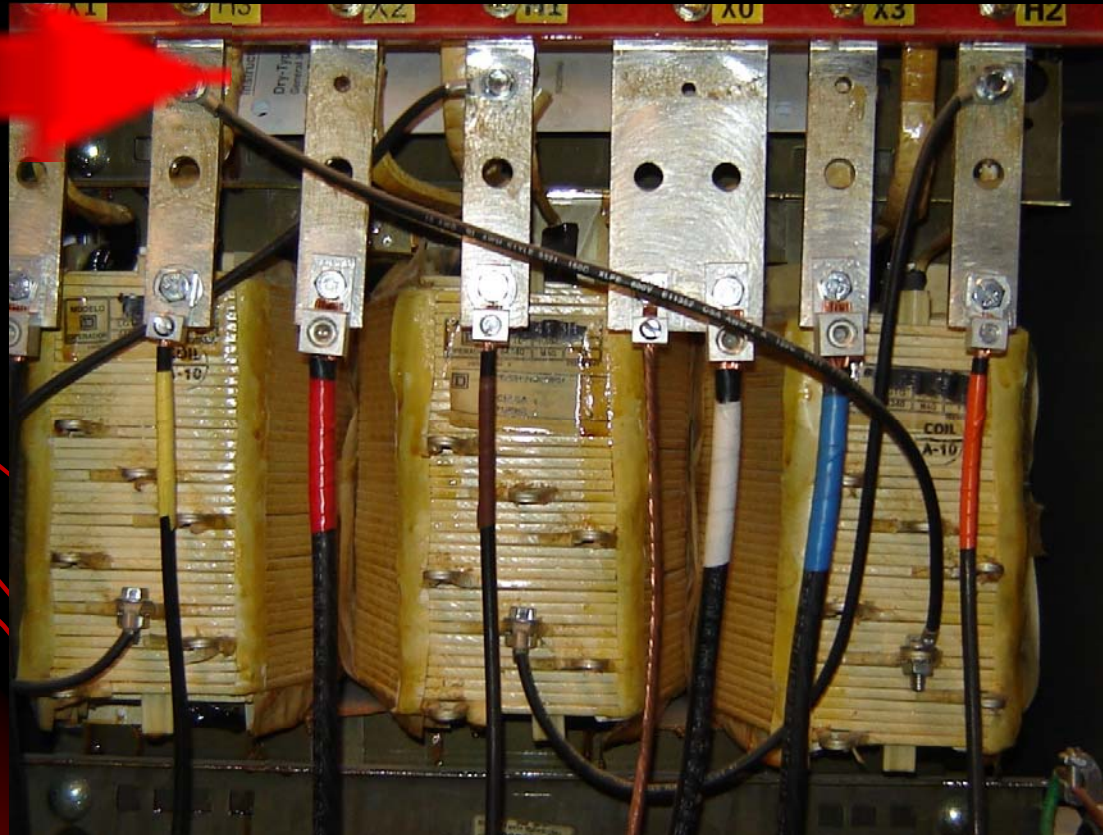
(X0 Missing Bonding Jumper)



# Electrical Systems

## Transformer

(Fire Hazard – Instruction Manual on top of Coils)



# Electrical Systems

## Wiring

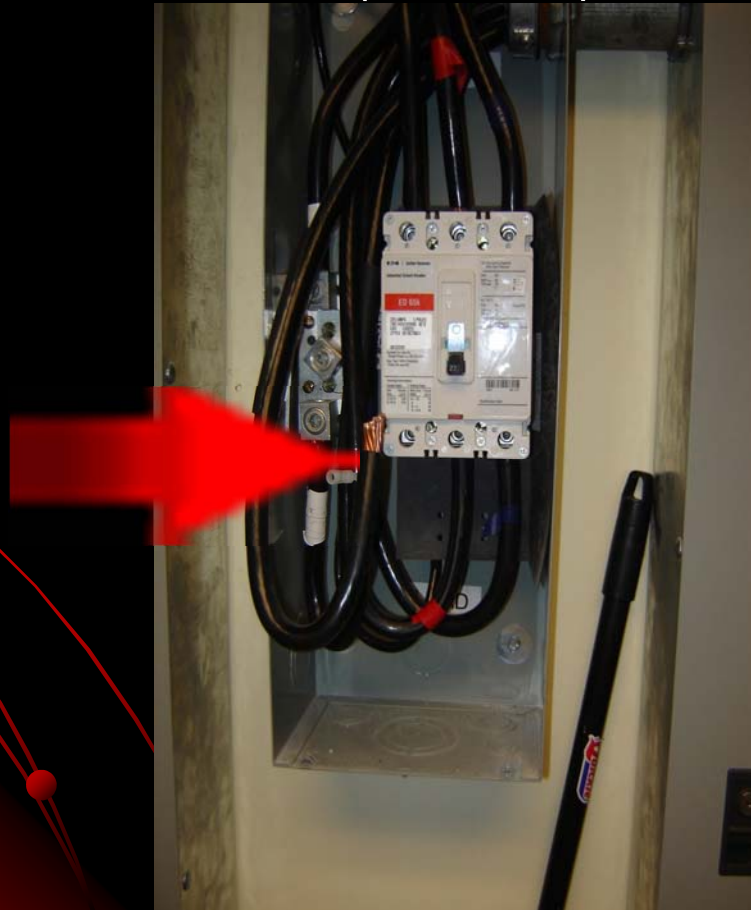
(Bonding Jumper Size?)



#10 Bonding Jumper  
To grounding hub?

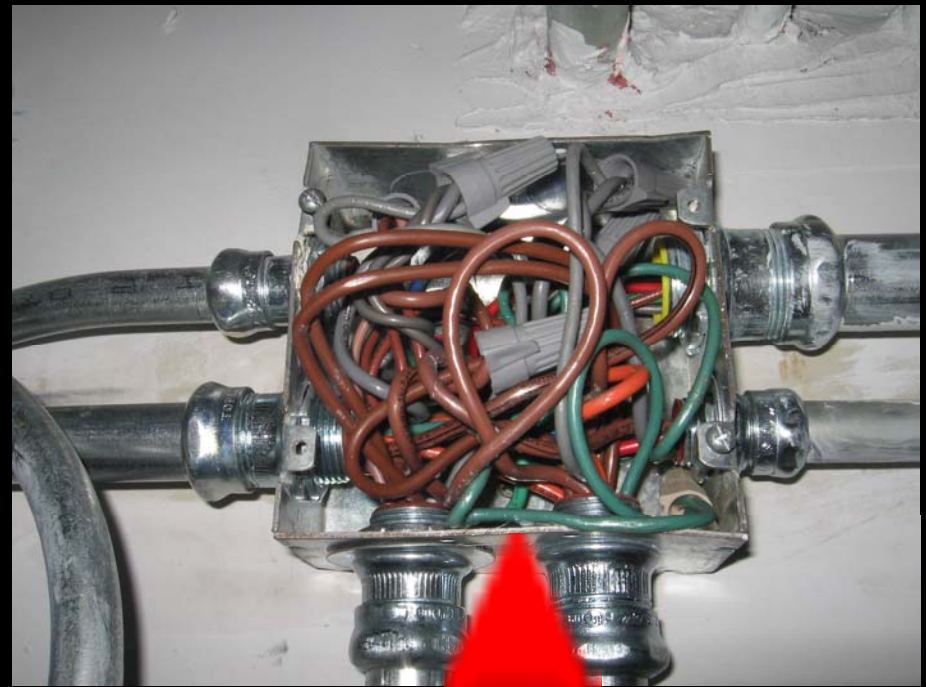
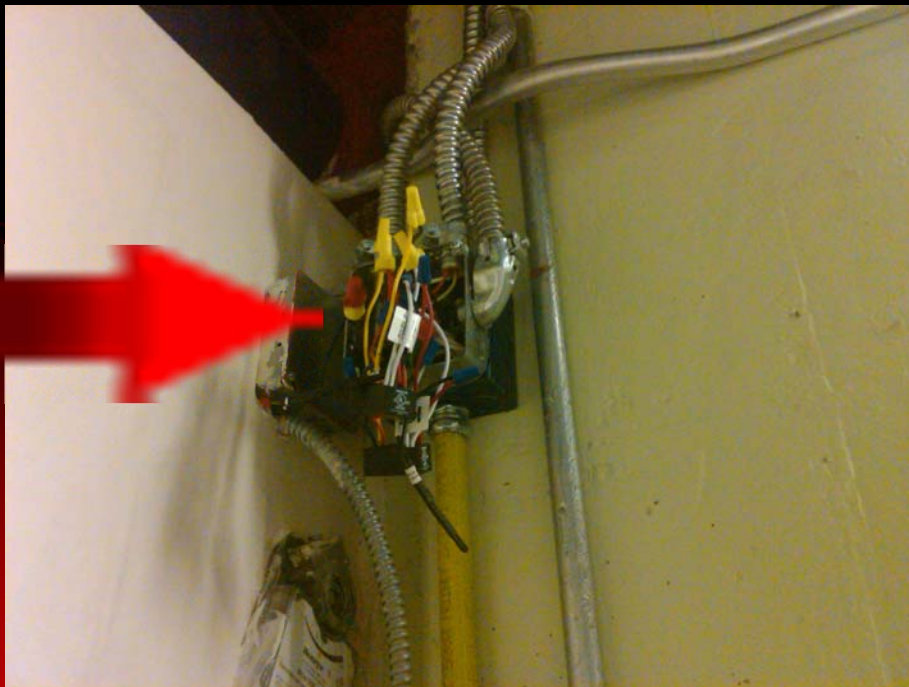
# Electrical Systems

Wiring  
(Loose?)



# Electrical Systems

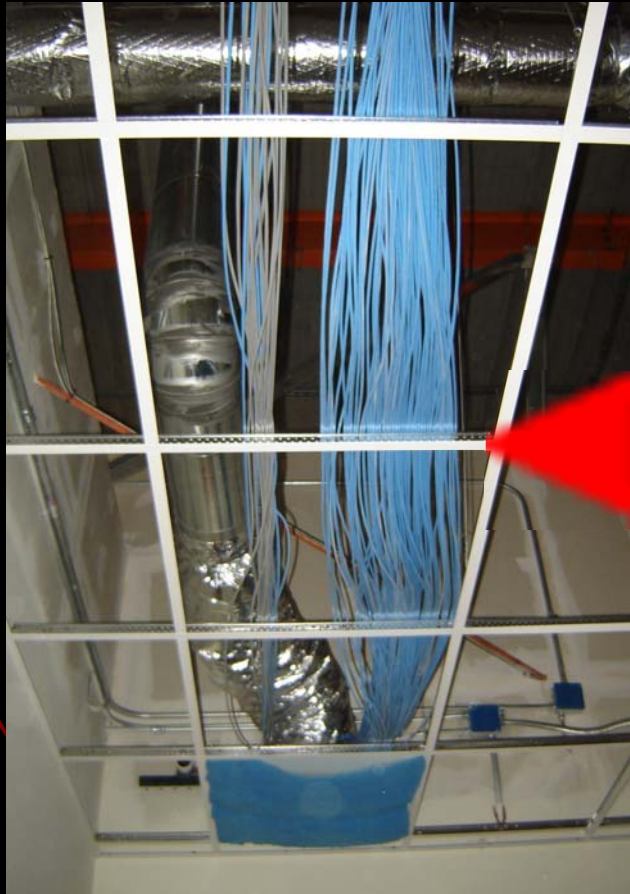
## Wiring (Open Boxes – Box Fill)





# Electrical Systems

## Wiring (Data Cabling - Support)





## Irony

I think the training is complete

# Thank you!

Questions?

Todd Manning, P.E.

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<http://www.nc-sco.com/>

# 31st Annual State Construction Conference

## LUNCH BLESSING



March 22nd, 2012