

2016 Bridge Conference Workshop Safety Discussion



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Agenda

- ▶ Fall Protection
 - ▶ Working Over Water
- ▶ Confined spaces
- ▶ Health Risks
 - ▶ Histoplasmosis
 - ▶ Ticks
- ▶ Night work
- ▶ PPE

Fall Protection



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Why do we talk about Falls?

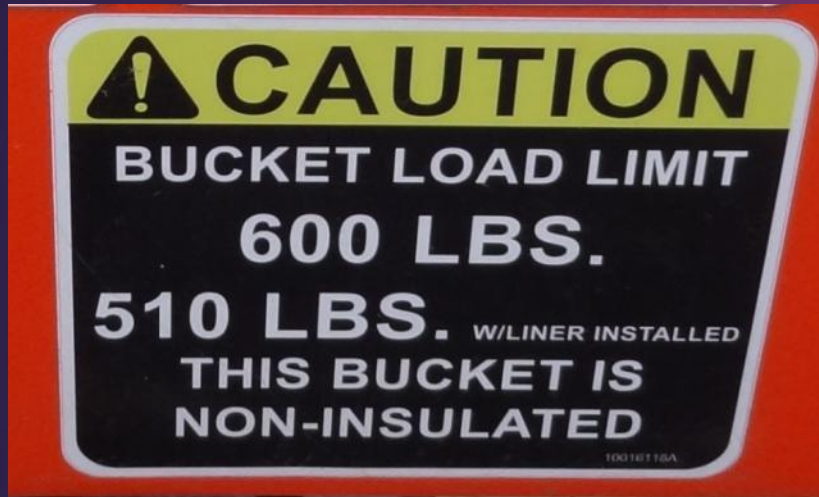
- ▶ Since 1999, falls are the #2 leading cause of workplace fatalities in the U.S.
 - ▶ Transportation-related accidents #1
 - ▶ Workplace violence-related homicides #3
- ▶ In 2010, 635 workers died due to falls
- ▶ In a fall from a height of 11 feet or more, you have a 50-50 chance of survival

MDOT's 2013 Citation

Note the placement of the lanyard and the worker on the structure.



Rub a dub dub - 3 Men in a... Bucket



...who together weighed
more than 600 pounds.



But I gotta do my job!!



- ▶ Anchor points must meet 5000 lbs. per employee tied off, or...see a P.E....
 - ▶ Beam clamps
 - ▶ Beam wrap
 - ▶ Beam slides
 - ▶ Beam trolleys
 - ▶ Etc., etc., etc.....
- ▶ Some examples from Miller's Fall Protection website
 - ▶ Look under "Temporary Anchorage"

Fall Protection Anchors



...an example of one in use...



...and be sure you are 100% tied off!

Lanyards

- ▶ Make sure you are using the right lanyard for the work
- ▶ Make sure the connector is the right one for the anchor
- ▶ Get one that's the right length (4', 6', etc.)
- ▶ Two legged
- ▶ Two legged retractable
- ▶ Etc., etc., etc.



Fall Prevention - Ladders

- ▶ Inspect before use.
 - ▶ Side rails in good condition.
 - ▶ Rungs in good condition
 - ▶ Surfaces free of grease, oil, etc.
 - ▶ All hardware in place.
 - ▶ Foot pads in place.
- ▶ “Tag-out” if in need of repair.
- ▶ Set at 1 to 4 angle.
- ▶ Extend three feet past next level.
- ▶ Special purpose ladders must meet 3.3 to 4 times the max intended load.



Note the tie wire on the ladder to secure it from moving.

Right way to use a ladder?

84
years
old!



Fall Prevention - Scaffolds

- ▶ Shall support 4 times the max intended load.
- ▶ Shall be fully planked with scaffold grade lumber (2x10).
- ▶ Guardrail installed on any open sides if 10 feet or higher.
- ▶ Overhang of planks is to be 6 to 12 inches (unless its an engineered platform).



Scaffold not fully planked.

Scaffolds

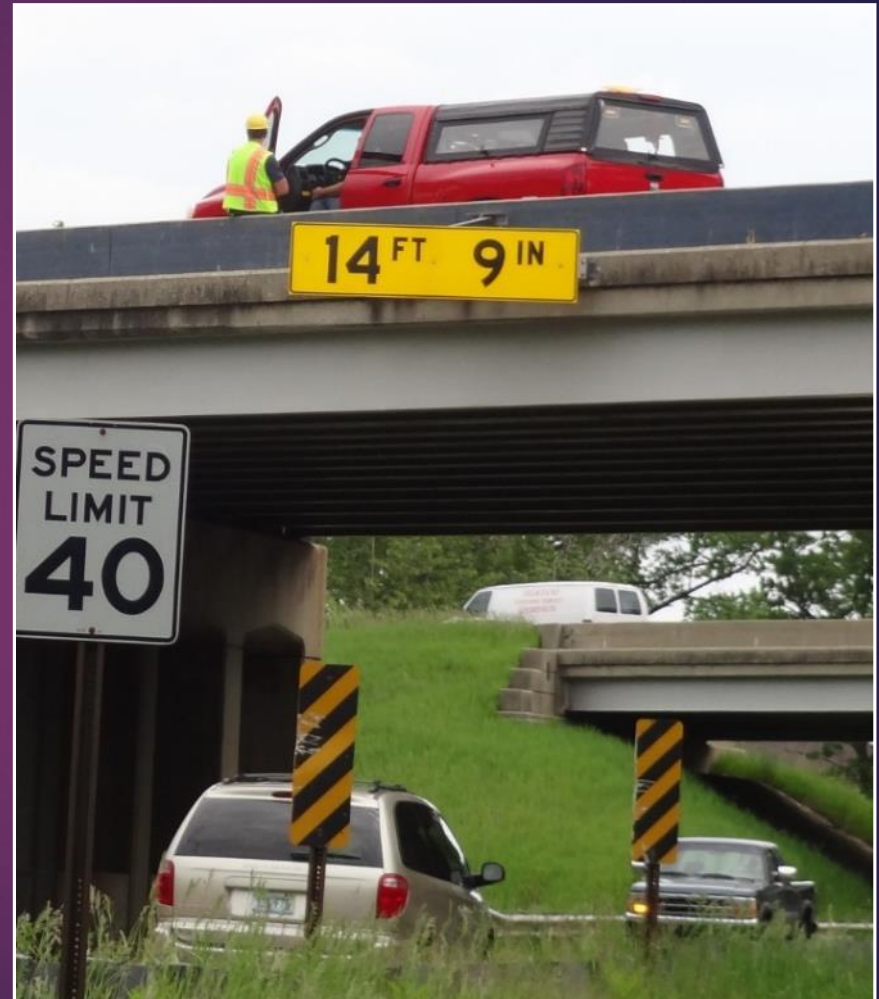


Scaffold with no guardrail
(note TMA location too
close).

Scaffold with no pad on feet.

MIOSHA Citations – Fall Protection

- ▶ Recap – 2013 MDOT worker leaning against bridge concrete barrier wall.
- ▶ MIOSHA stopped as worker looked like he was sitting on barrier wall.
 - ▶ Wall was 34" (+/-)
- ▶ Status – We settled, but...
 - ▶ Do not lean against, sit on, or reach over short walls without proper fall protection.
 - ▶ And...
- ▶ But What About Inspections?!?!?



Good Guardrail!

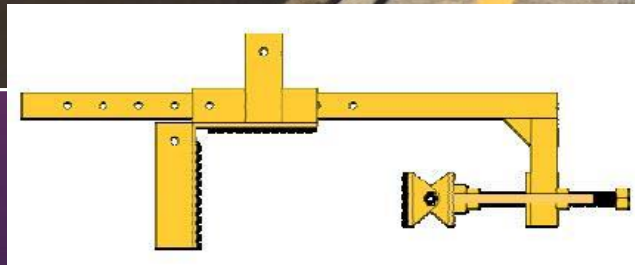
- ▶ Top rail – 42" +/- 3" high.
- ▶ Midrails – no less than 21" high.
- ▶ Top rail shall withstand 200 lb. force.
- ▶ Midrail shall withstand 150 lb. force.
- ▶ (Note: This also has a toe board which is a good feature...)



MIOSHA Citations – Fall Protection

(cont.)

...for any bridge project with a wall or rail less than 42" +/-3", an auxiliary rail must be added. Examples shown below.



Other Fall Protection Issues



Gaps too large

Fall Issue?



Fall Protection Issue?





Working over Water



Working Over Water – MIOSHA Citation 1



Working Over Water – MIOSHA Citation 2



Working Over Water

- ▶ **MIOSHA, Construction Standards, Part 6, Personal Protective Equipment:**
- ▶ **R 408.40636. Working over or near water.**
- ▶ **Rule 636.** (1) Where a possibility of drowning exists, each employee working over or adjacent to water shall wear a life jacket or buoyant work vest. The life jacket or buoyant vest shall bear a label, “U.S. Coast Guard approved.”

Working Over Water (MIOSHA Rules cont.)

- ▶ (2) Before each use, a competent person shall inspect the life jacket or buoyant vest for defects which might alter its strength or buoyancy. Defective units shall not be used.
- ▶ (3) A ring buoy with not less than 90 feet of safety line shall be provided and shall be readily available for rescue operations. The distance between the buoys shall not be more than 200 feet.
- ▶ (4) Not less than 1 lifesaving boat equipped with a method of propulsion that is effective for the water conditions shall be available at the location where an employee works over or adjacent to water.

Working Over Water (related rules)

- ▶ **MIOSHA, Construction Standards, Part 45, Fall Protection:**
- ▶ **1926.501 Duty to have fall protection.**
- ▶ **(1)“Unprotected sides and edges.”** Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.



What to Think About When Working Over Water

- ▶ Are there any potential fall hazards? Is there a chance for falling from a height of 6 feet or more to the surface below?
- ▶ Is there a guardrail in place or are workers wearing fall arrest equipment 100% of the time?



What to Think About When Working Over Water

- ▶ If the worker falls with their fall arrest equipment (body harness and lanyard), what is the plan for rescuing that worker? Self rescue, other co-workers, specialized equipment (Reachall)?
- ▶ Is there a rescue plan for a worker who falls into the water?
 - ▶ Ring buoy?
 - ▶ Boat nearby?
 - ▶ Rescue services nearby? (Ready and available to help and have been contacted beforehand?)
- ▶ Are rescue workers wearing life vests?

MIOSHA – Local Emphasis Program (LEP)

MIOSHA says it will target certain sectors based on U.S. Department of Labor, Bureau of Labor Statistics, 2013 national figures of non-fatal occupational injuries and illnesses:

- ▶ Siding Contractors
- ▶ Structural Steel and Pre-Cast Concrete Construction Sectors (which includes for example **Bridge projects**)
 - ▶ Inspections will focus on Fall Protection, PPE, Cranes, Ladders, Site Conditions, and Electrical
 - ▶ MIOSHA Agency Instruction and Inspection Checklists:
 - ▶ http://www.dleg.state.mi.us/wsh/docs/inst/miosha_com_15_3.doc

Federal Rail Administration (FRA) vs. MIOSHA

- ▶ What about railroad bridges?
- ▶ Who owns that section?
- ▶ Who operates?
- ▶ Guardrails on bridges?
 - ▶ Fall protection?
 - ▶ Fall arrest? Rail slides?
- ▶ FRA says....
- ▶ MIOSHA says....
- ▶ In conversations with MIOSHA, they say they look also at who the employer is, then they'll get involved, and sort it out later...



Histoplasmosis

- ▶ An infectious disease caused by inhaling the spores of a fungus called *Histoplasma capsulatum*.
- ▶ Fungus lives in the environment, usually in association with large amounts of bird or bat droppings.
- ▶ Histoplasmosis is not contagious, so it cannot be transmitted from an infected person or animal to someone else.



Histoplasmosis

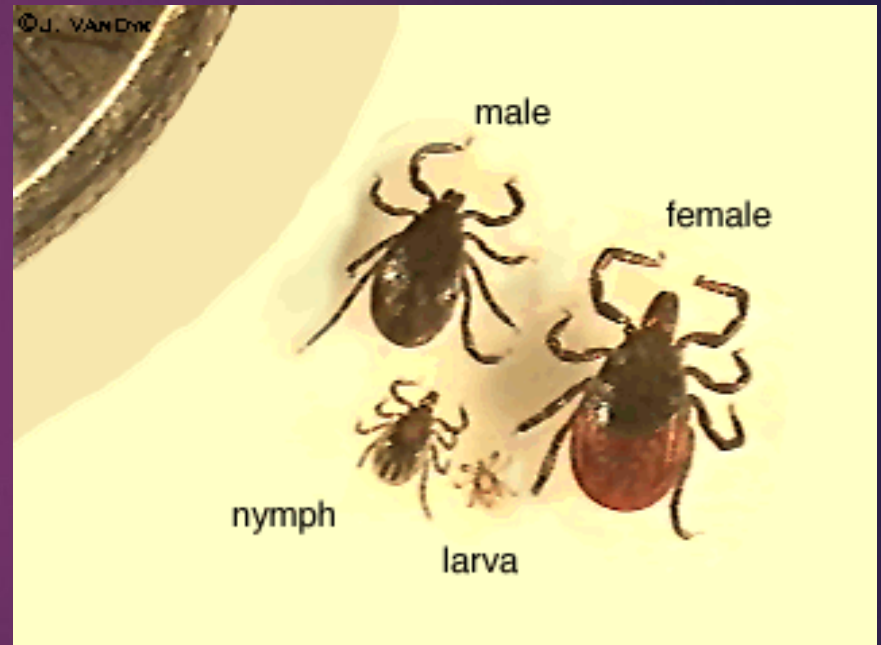
- ▶ Histoplasmosis primarily affects a person's lungs, and its symptoms vary greatly between individuals.
- ▶ The vast majority of infected people have no apparent ill effects, or they experience symptoms so mild they do not seek medical attention and may not even realize that their illness was histoplasmosis.
- ▶ If symptoms do occur, they will usually start within 3 to 17 days after exposure.
- ▶ Histoplasmosis can appear as a mild, flu-like respiratory illness and has a combination of symptoms, including a general ill feeling, fever, chest pain, dry or nonproductive cough, headache, loss of appetite, shortness of breath, joint and muscle pain, chills, and hoarseness.

Suggested Work Practices:

- ▶ Wet the material with a water spray to reduce the amount of dust.
- ▶ Safe removal of accumulations of bird or bat manure before demolition may be necessary.
- ▶ Wearing a NIOSH-approved respirator. NIOSH advises that any particulate filter is effective for use. However for bridge work and inspection, there is a chance these respirators may be exposed to automotive related materials (oil, etc.) therefore an oil-proof P class filter with 99.97% efficiency (P-100) is recommended.
- ▶ Disposable protective clothing (such as a “Tyvek” suit) and disposable gloves should be worn whenever regular work clothing and shoes might be contaminated with dust containing *H. capsulatum* spores.

Ticks

- ▶ A tick has a one-piece body. The harpoon-like barbs of its mouth attach to a host for feeding. Crablike legs and a sticky secretion help hold the tick to the host.
- ▶ Ticks are not insects like fleas, but arachnids like mites, spiders and scorpions.
- ▶ (Image of deer tick to the right next to a dime for size comparison.)



Ticks – Prevention & Treatment

- ▶ Dress properly.
 - ▶ Light colored clothing.
 - ▶ Long pants.
- ▶ Conduct frequent tick-checks.
 - ▶ This includes a visual inspection of the clothing and exposed skin. Be sure to check the scalp, back of your neck at the hair line, behind and in the ears, and behind any joints.

- ▶ Remove ticks immediately.
 - ▶ Using fine-point tweezers, grasp the tick where the mouth parts are embedded into the skin and pull gently. Make sure you've cleaned your hands, the bite site, and the tweezers with disinfectant. You may want to wear latex gloves.



Apply only to clothes!

Confined Spaces



MIOSHA – Confined Space in Construction

- ▶ New Standard developed by OSHA and adopted in full by MIOSHA.
 - ▶ MIOSHA Part 35:
 - ▶ http://www.michigan.gov/documents/lara/lara_miosha_CS_35_504208_7.pdf
- ▶ Incorporates many of the same requirements for confined spaces as used in General Industry:
 - ▶ Identification of confined spaces
 - ▶ Permits for entry
 - ▶ Two key differences:
 - ▶ *Host employer* – A new term which means the employer that **owns** or manages the property where the construction work is taking place.
 - ▶ Communication is a must between Host employer, Controlling contractor, and all the subcontractors.

Confined Space in Construction

(continued)

- ▶ What's a Confined Space?
 - ▶ Is large enough and so configured that an employee can bodily enter it...
 - ▶ Has limited or restricted means for entry and exit...
 - ▶ Is not designed for continuous employee occupancy...
- ▶ What's a Permit Required Confined Space?
 - ▶ One that has one or more of the following:
 - ▶ Hazardous atmosphere or potential to contain a hazardous atmosphere
 - ▶ Material that has the potential for engulfing an entrant
 - ▶ An internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section
 - ▶ Any other recognized serious safety or health hazards

Examples of Confined Spaces

- ▶ Manholes/Catch Basins
- ▶ Tanks
- ▶ Concrete Pier Columns
- ▶ Storm Drains
- ▶ Drilled Shafts
- ▶ Enclosed Beams
- ▶ Culverts
- ▶ Lift Stations/Pump Houses
- ▶ Silos
- ▶ Inside of Segmental Bridges
- ▶ Enclosed Bridge Columns
- ▶ Tunnels*
- ▶ Cofferdams*
- ▶ Trenches*

Confined Space in Construction

- ▶ *However, those items that were *asterisk on the preceding slide are NOT part of the new standard, as there are already separate MIOSHA standards that cover them:
- ▶ (2) This standard does not apply to any of the following:
 - ▶ (a) Construction work regulated by Construction Safety Standard Part 9 “Excavation, Trenching, and Shoring.”
 - ▶ (b) Construction work regulated by Construction Safety Standard Part 14 “Tunnels, Shafts, Caissons, and Cofferdams.”
 - ▶ (c) Construction work regulated by Occupational Health Standard Part 504 “Diving Operations.”
 - ▶ (d) Construction work regulated by Occupational Health Standard Part 665 “Underground Construction, Caissons, Cofferdams, and Compressed Air.”

Confined Space in Construction (continued)

- ▶ **1926.1203(h)** *Permit space entry communication and coordination.*
- ▶ **1926.1203(h)(1)** Before entry operations begin, the host employer must provide the following information, if it has it, to the controlling contractor:
 - ▶ **1926.1203(h)(1)(i)** The location of each known permit space;
 - ▶ **1926.1203(h)(1)(ii)** The hazards or potential hazards in each space or the reason it is a permit space; and
 - ▶ **1926.1203(h)(1)(iii)** Any precautions that the host employer or any previous controlling contractor or entry employer implemented for the protection of employees in the permit space.
- ▶ **1926.1203(h)(2)** Before entry operations begin, the controlling contractor must:
 - ▶ **1926.1203(h)(2)(i)** Obtain the host employer's information about the permit space hazards and previous entry operations; and
 - ▶ **1926.1203(h)(2)(ii)** Provide the following information to each entity entering a permit space and any other entity at the worksite whose activities could foreseeably result in a hazard in the permit space:

Is this a Confined Space?



What are some of the potential hazards in a Confined Space?

- ▶ Atmospheric conditions
- ▶ Asphyxiation
- ▶ Flammable atmospheres
- ▶ Toxic conditions
- ▶ Burn hazards
- ▶ Heat stress hazards
- ▶ Mechanical hazards
- ▶ Engulfment hazards
- ▶ Physical hazards (fall, slip/trip, debris)
- ▶ Electrical hazards
- ▶ Noise hazards

Culverts



What are the Potential Hazards you face with Culverts?

- ▶ Water?
- ▶ Animals?
- ▶ Insects?
- ▶ Gas? (What kinds?)
- ▶ Heat?
- ▶ Slips and Trips?
- ▶ Traps?
- ▶ Structural collapse?
- ▶ Others?



Culvert – What Hazards?



Culvert – What Hazards?



So what should you think about with Culverts

- ▶ Access? (How are you getting in?)
- ▶ Size?
- ▶ Standing water?
- ▶ Decaying vegetation under the water?
- ▶ Air flow?
- ▶ Visibility? (Debris dam? Change in direction?)

Culvert Discussion

- ▶ Have you thought of all the hazards?
- ▶ How will you eliminate those hazards?
- ▶ What may happen once you're in?
 - ▶ Atmosphere changes?
 - ▶ Water inrush?
 - ▶ Cave in?
- ▶ How will you handle non-entry rescue?
- ▶ Who is in your area for entry rescue (and did you contact them ahead of time)?

Is this a Confined Space?



But is it a Permitted Confined Space?

Lighting – Night Work

▶ MIOSHA General Rule:

- ▶ 5 foot-candles (min) when walking to and from the work area
- ▶ 10 foot-candles (min) where the work is being done

▶ MMUTCD:

- ▶ When nighttime work is being performed, lighting shall be provided to illuminate the work area per MIOSHA General Rule...
- ▶ Except in emergency situations, traffic regulator stations shall be illuminated at night per MIOSHA General Rule...



Can you see the workers next to the paver?



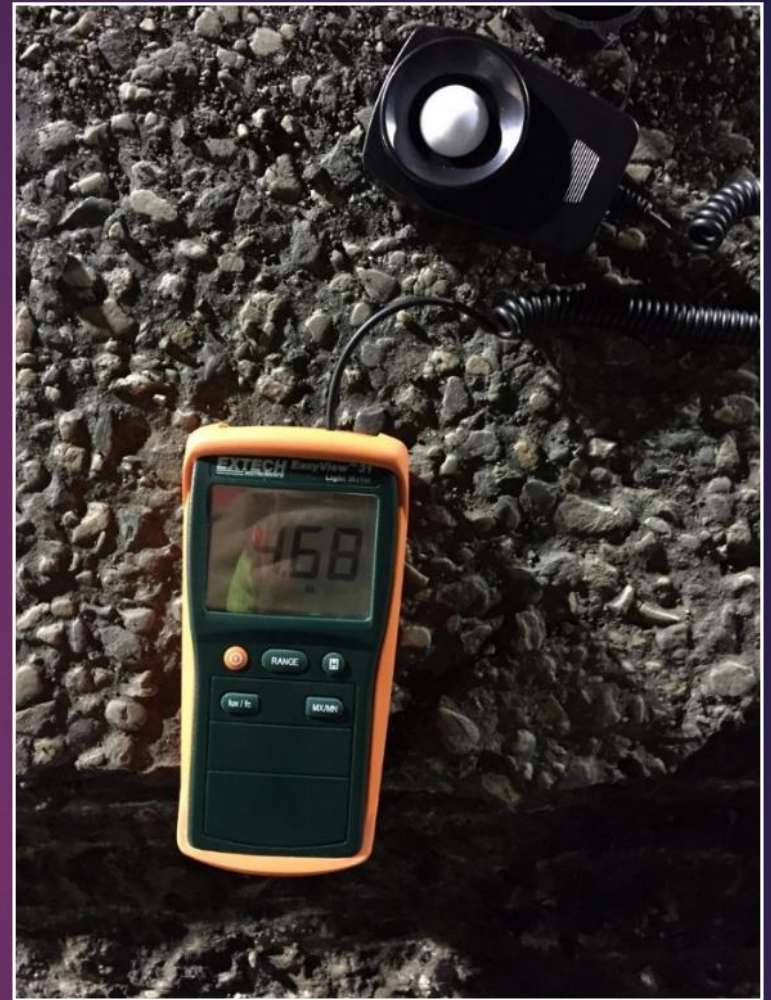
Notice the glare to the motorists. Can you see the traffic regulator?

See the excavator and truck?





Note the visibility of the Stop/Slow paddle.



The light meter reads 4.68 fc at the traffic regulator station.





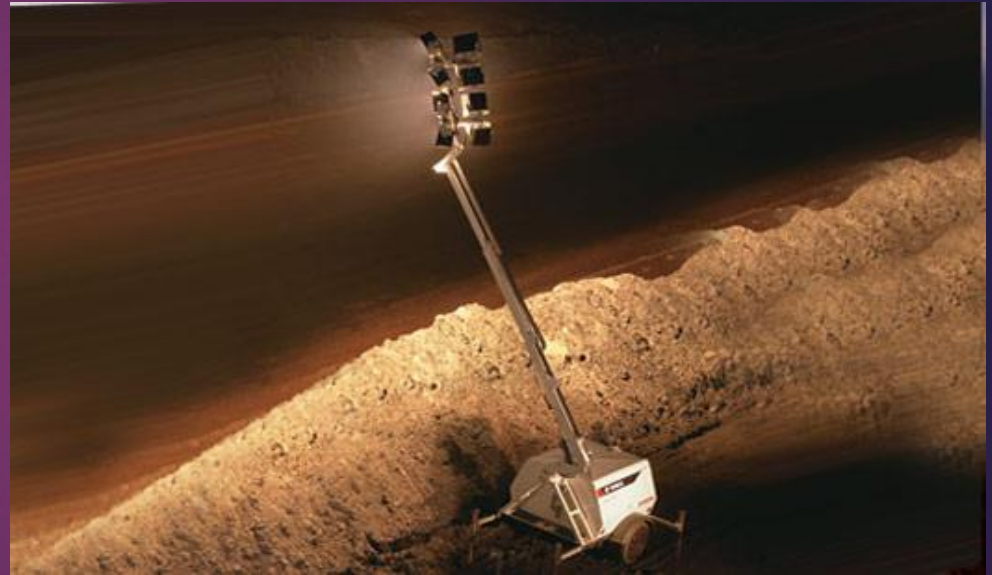
Great lighting for a bridge project.



Inexpensive Lighting for Smaller Operations



Light Towers



Balloon Lighting



Things to think about...

- ▶ Ease of use for the workers?
- ▶ Integral or separate to the truck?
- ▶ Impact on motoring public?
 - ▶ Glare/angle of lights
- ▶ Lighting should help the workers see and be seen
 - ▶ Do they have personal lighting as well (headlamps)?
- ▶ Is there a light meter available to check?



Hi Vis Apparel Reminder

- ▶ Per the MMUTCD:

- ▶ Section 6D.03

- ▶ All workers,...within the right-of-way...shall wear high-visibility safety apparel that meets Class 2 or 3 requirements of ANSI 107.



...but they must also be in good shape...



..the Good, the Bad, and the Ugly...



MDOT In-House YouTube Safety Videos

- ▶ [One Step From Death-Scott's Story](#)
- ▶ [MDOT Personal Protective Equipment \(Questionable Preconceptions\)](#)
- ▶ [Nighttime Work Zone Safety](#)
- ▶ [How to Safely Regulate Traffic in Michigan](#)
- ▶ [One Step From Death-Charlie's Story](#)





Quiz: How many safety violations do you see?

- ▶ No safety glasses
- ▶ Vests in poor condition
- ▶ No means of egress (greater than 4' deep)
- ▶ Sling
- ▶ Hook used for lifting
- ▶ No hard hat for worker under the equipment
- ▶ Undermining of pavement (with spoil pile too close)
- ▶ Others?

...and coming
to a job site
near you...

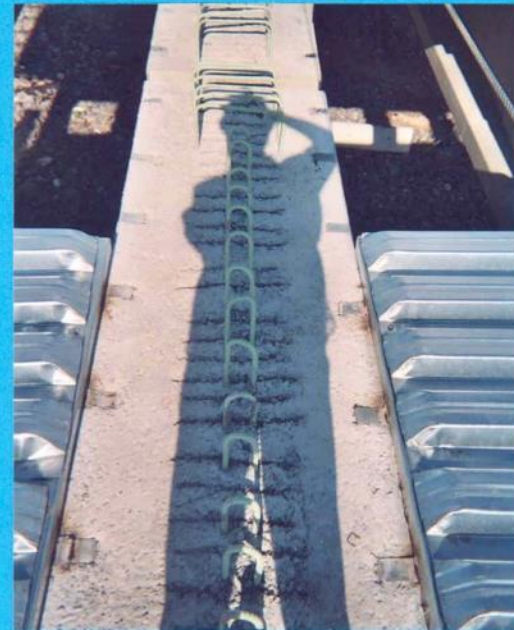
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Coming soon...

Jim Gaus

as

Safety Man



"The Ghost"

*So stealth and mysterious
only his shadow can be caught on film.*

Questions?

