Safety in Residential Construction

Presented By:
Consultation Education & Training (CET) Division
Michigan Occupational Safety & Health Administration (MIOSHA)
Michigan Department of Licensing & Regulatory Affairs (LARA)
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(517) 284-7720

Objectives

- Review the "Residential Construction Local Emphasis Program" and statistics
- Review the top 5 hazard categories in residential construction
- Overview of current safety resources for residential construction

RESIDENTIAL INITIATIVE & LOCAL EMPHASIS PROGRAM

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Reasoning for the Initiative

Residential construction has been experiencing moderate growth during the past few years which has contributed to the higher injury rates and fatalities in construction. According to the U.S. Bureau of Labor Statistics, the total case incident rate (TCIR) for Michigan construction increased from 2.6 injuries and illnesses per 100 full-time workers in 2011 to 5.0 in 2012. Over the last five years, from 2008 – 2013, over **37% of construction fatalities in Michigan have occurred in the residential industry**.

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Initiative Components

Outreach:

- Initiative letter mailed to Residential Construction NAICS codes
- Dedicated “Residential Initiative” web page
- Development of Case Studies, Fact Sheets, and Training Materials and Seminars
- Development of Residential Construction Inspection Checklist
- Working with the Home Builders Association and material vendors to provide free training seminars

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Initiative Components

Enforcement:

A **Residential Construction Local Emphasis Program (LEP)** - Increasing inspections of single and multi-family home construction concentrating on the “**Top 5**” serious hazard categories commonly associated with residential construction including:

- **Falls,**
- **Scaffolds,**
- **Ladders,**
- **PPE/Tool Guarding, and**
- **Electrical.**

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Who Can Afford an Injured Worker?

- MIOSHA Fines
  - More frequent residential inspections
  - Increased penalty for repeat violations
  - Multiple “Serious” citations could result in high penalties
- Higher Workers Compensation Insurance premiums
- Lawsuits
- Time to deal with an injury
- Professional Image
- Employee Morale

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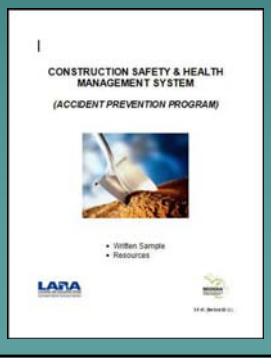
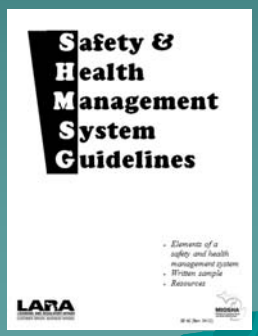
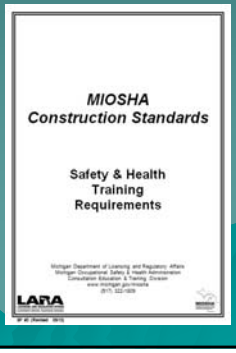
First Thing: Have a Safety Plan

You need an Accident Prevention Program:

- MIOSHA provides a Template
- Implement an effective system for safety
- Understand your training requirements







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Safety Plan Should Address…

- Shall include hazards that employees are exposed to, how to correct and avoid those hazards.
- Example: If your work operation includes the use of ladders, then employees need training on the proper use of ladders.

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TOP FIVE HAZARDS IN RESIDENTIAL CONSTRUCTION

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Residential Top Five Serious Hazard Categories

- Personal Protective Equipment (PPE) and Tool Guarding
- Falls
- Ladders
- Scaffolds
- Electrical

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PERSONAL PROTECTIVE EQUIPMENT

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Personal Protective Equipment

PPE is required for safety hazards that expose employees to injury of the:

- Head
- Eyes
- Feet
- Hands
- Body

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Employer Responsibilities

At a minimum the employer shall:

- Assess the workplace and operations to identify hazards that employees are exposed to
- Shall provide at no cost to employees the personal protective equipment necessary to guard against known hazards
- Require employees to wear Personal Protective Equipment

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Head Protection

An employer shall ensure that each affected employee is provided with, and wears, head protection for exposure to head hazards such as: hoisting operations, standing up walls, concrete pumper trucks, use of scaffolds, etc.

Face & Eye Protection

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Face & Eye Protection

Shall be used when any

of these hazards are present:

- Flying objects or particles (metal shavings or sawdust)
- Harmful contacts (objects dropped onto head)
- Liquids that may splash
- Intense light from welding, lasers, electrical flash

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But You Have Got to Wear It

Johan Franzen 2011: Went back out to play, looking like this. STILL refused to wear a face mask.

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Guarding of Tools

A circular table saw shall have a hood type guard covering the blade at all times.

- The hood type guard shall enclose the blade above the table and above the material by adjusting automatically to the thickness of the material being cut
- Or it may be a fixed or manually adjusted hood-type guard if the hood remains in contact with the material

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Foot Protection

Shall be provided if conditions of the job are likely to cause a foot injury.

- Heavy objects (barrels or tools).
- Sharp objects such as nails or spikes that might pierce ordinary shoes.

The employee shall provide the foot protection.

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Hand Protection

Employees who handle rough, sharp edged, abrasive materials or whose work subjects the hands to lacerations, punctures, burns, or bruises shall wear hand protection suitable for the work being performed.

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Body Protection

When an employee is exposed to hazards such as radiation, alkalis, acids, abrasives, and temperature extremes other than those caused by weather conditions, appropriate head, body, and hand protection shall be worn to protect the employee from that hazard. Such personal protective equipment shall be provided by the employer.

- Example : Brick cleaning with acid.

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Summary

- Assess the workplace for hazards.
- Use engineering and work practice controls to eliminate or reduce hazards before using PPE.
- Select appropriate PPE to protect employees from hazards that cannot be eliminated.
- Train workers:
  - What
  - When
  - Where
  - How
  - Why
- Require workers to wear selected PPE.

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FALL PROTECTION

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Residential Construction

Definition:

The end use of the structure must be home or residence. The structure must be built using traditional wood framing materials and methods.

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Part 45 Fall Protection

- Any work 6 feet or more above lower levels will require some type of fall protection
- Examples:
  - Foundation form work
  - Installing floor trusses and sheathing
  - Building second floor walls
  - Wall openings, stairs and holes
  - Installing roof trusses and sheathing
  - Roofing (tear-off and installing new shingles)

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Typical Fall Protection Systems

- Guardrail systems
- Personal fall arrest systems
- Fall restraint / work positioning systems
- Hole Covers
- Controlled Access Zone
- Fall Protection Plan

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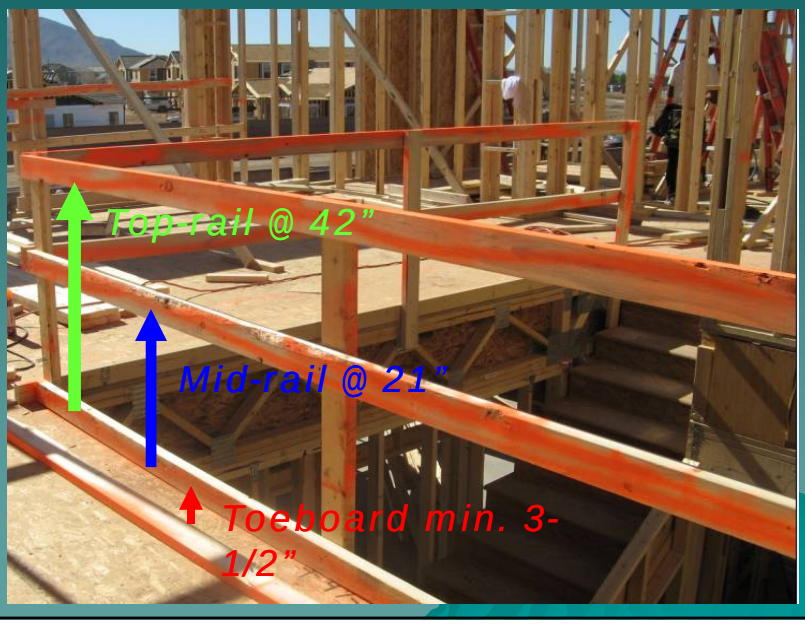
Guardrail System



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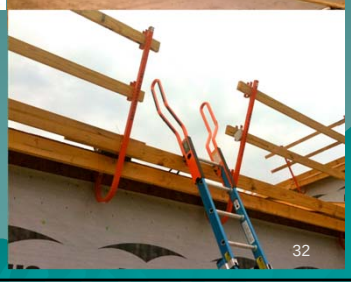
Building second floor walls

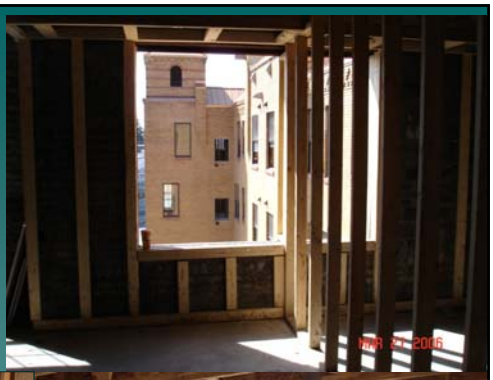
Residential Guardrail Systems

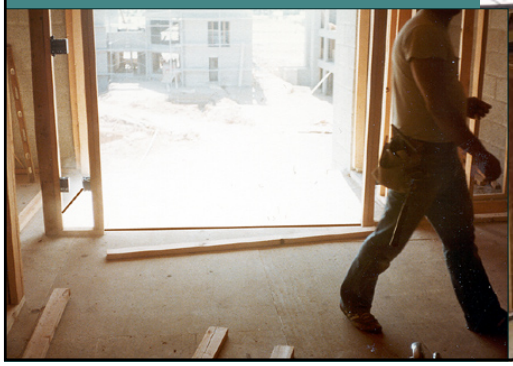


You have options!

Wall Openings

Definition:
Wall openings are more than 30” in height & 18” wide need fall protection





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Ramps, Runways, and Other Walkways

Stairways:

- Guardrail on open side of stairs and stair landings
- Handrail on right side descending

Ramps

- Minimum 2 planks wide
- 3 planks if wheel barrow is used
- Guardrail if over 6 feet or hazardous conditions

Anchorage

A secure point of attachment for lanyards or lifelines.

- Must support 5000 pounds.
- Or 2 times the intended load as part of a complete system

Cross-arm Strap

Ridge Anchor

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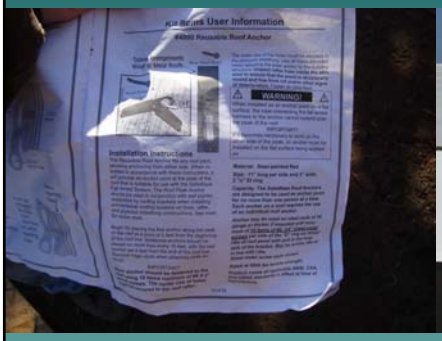
Manufacturer's Instructions



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Some Anchor Point Options

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Have you been trained for that?

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Swing Fall Hazard
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Holes

Definition:
A hole is any opening in a horizontal plane, typically a floor or roof, that is 2” or more in it’s least dimension.

Holes must be covered and covers must be:

- Able to support 2 times the intended load
- Marked with the word “Hole” or “Cover”
- Secured in Place

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Fall – Roofer – Residential
Date & Time: 07/07/09 at 9:21 p.m.
Age 19

Roofing employees were wrapping up for the night installing a tarp on a steep roof when an employee stepped onto the tarp causing him to slip and fall 19 feet approximately to the ground level.

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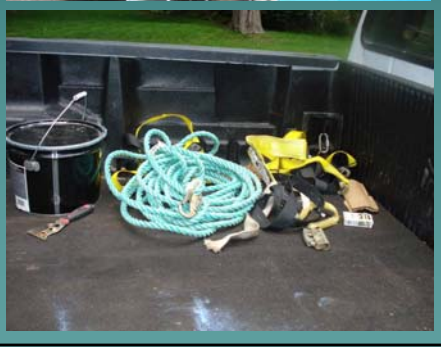

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Citations Issued

408.40114(1)(a)	No Accident Prevention Program
408.40115	No written certification of fall protection training
408.40132(3)	No one on site was first aid certified
408.40622(1)	No hard hats
408.40045(12)	Steep roof with no use of fall protection
408.41121(3)(a)	Split side rails of ladder
408.41124(5)	Ladder not extended 3 feet past landing surface
408.41139(1)	Employer did not report fatality within 8 hours
408.41862(3)	Plastic gas can

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Other options for working at heights

- Ladders
- Scaffolds
- Project Planning

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PORTABLE LADDERS

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Part 11. Ladders

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Part 11. Ladders

- Type 1 or heavier duty
- Extend 3’ above
- On firm ground
- Tied off at top
- 4 to 1 pitch
- Never over-reach to the side. Over-reaching means both shoulders outside the rails.

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Work From Ladders

- Never over-reach to the side. Over-reaching means both shoulders outside the rails.
- Don’t carry items up the ladder that could cause you to lose your balance
- Maintain 3 points of contact while moving up or down the ladder

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Portable Ladders – Power Lines

- Watch for power lines above.
- Keep aluminum ladders at least 20 feet away from power lines.
- Fiberglass ladders must be at least 10 feet away.

55

Portable Ladders – Stepladders

- Unless the stepladder is equipped with a handrail, the top step and cap shall not be used to stand on.
- An employee shall not use the backside of a stepladder for climbing.

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SCAFFOLDS & SCAFFOLD PLATFORMS

57

Work From Scaffolding

58

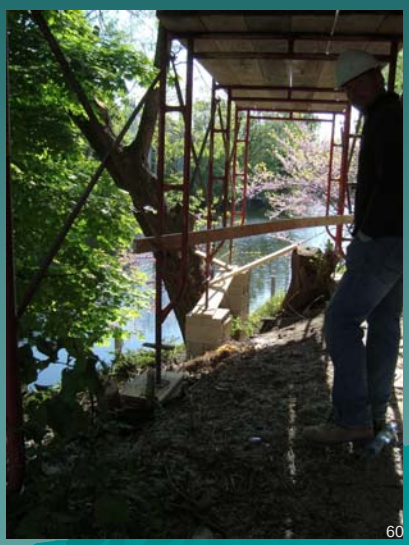
Construction and Capacity

- A scaffold shall be designed, constructed, erected, and used in accordance with the provisions of this part. A scaffold shall be designed by a qualified person.

59

Scaffolds – Competent Person

- A “competent person” must supervise the construction and dismantling of a scaffold
- The competent person must inspect the scaffold before each shift.
- Scaffolds must be built on firm foundation, free of settling.



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Scaffolds - Construction

- Scaffold uprights must be on base plates. Base plates shall rest on mudsills or other firm foundation (such as concrete floor).
- A “mudsill” is a section of a 2” x 10” plank. You cannot use single OSB, 2” x 4”s, 4” x 4”s or other job site trash as mudsills.
- Never use concrete blocks or other unstable items to level the scaffold.
- Instead, use screw-jacks to raise or lower the height.

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Planking and Scaffold Platforms

- The platform shall consist a minimum of 2 planks laid side by side.
- Each platform on all working levels shall be fully planked or decked between uprights.
- Wood planks shall be scaffold-grade, a minimum of 1500 psi.
- Planks shall be 2” x 10”.

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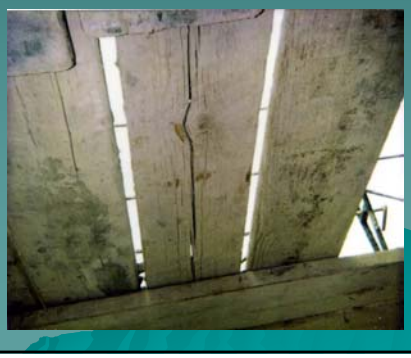
Planking and Scaffold Platforms

- All defective wood planks, laminated planks, manufactured work platforms, and picks shall be removed from service.



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Planking and Scaffold Platforms

- Extend over the bearer a min. of 6 inches, but not more than 12 inches.
- Be cleated or fastened down to prevent shifting and be uniform in thickness, except where lapped.
- Hook on type platforms may be used if they are secured to the bearer.

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Scaffold – Guardrails

- Guard rails must be on the back and the sides of scaffold when it is 10’ or higher.

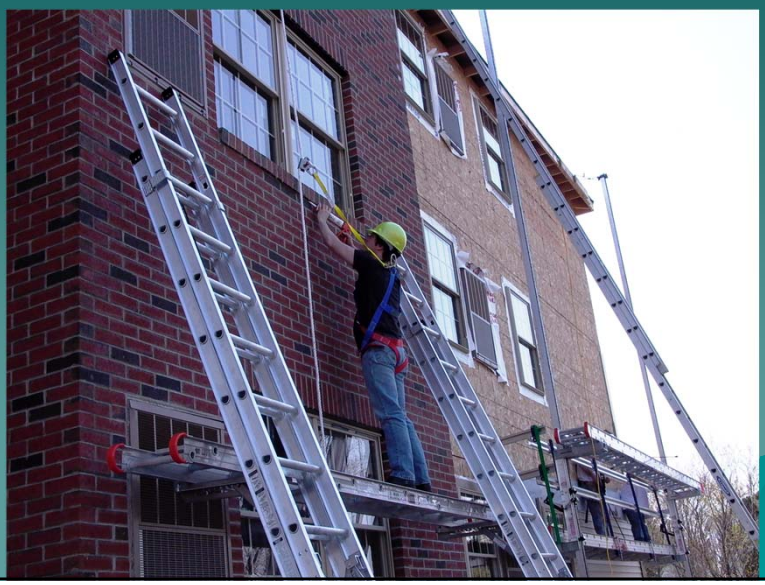
66

Crossbraces as Guardrails

A cross brace may be used as part of the guardrail system as follows:

- If pivot occurs from 36” to 48’’ above the platform… install a midrail.
- If pivot occurs from 18” to 36’’… install a top rail.
- If pivot occurs less than 18” or more than 48’’…install both.

Ladder Jacks



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Pump Jack Scaffolding

70

Carpenter Bracket Scaffold

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Forklift Scaffold

The basket for a rough terrain fork truck scaffold:

- Shall not extend more than 10” to either side of the load bearing tires or outriggers.
- Be attached to the forks by mechanical means
- Have pockets that fully envelope the forks
- Have a guard rail that fully encloses the basket
- Be of all mild steel construction
- And have a tag indicating the weight and capacity of the basket

73

Rough Terrain Forklift Platforms

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Does this platform meet the specifications?

75

Working from Rough Terrain Forklift Platforms

- Employees in the basket must wear a harness and be tied off to a secure anchor point
- Employees shall not climb the boom of the truck to enter or exit the basket
- The Fork Truck shall not be repositioned while employees are in the basket.

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Fatal Fall

Commercial - Laborer

Age: 45

The employee was using an 8 feet stepladder on a rough terrain fork truck platform to gain additional reach when he ***fell 30 feet*** from the platform to the ground. Employee was installing leaf guard on rain gutters. Chippewa Co

77

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Foundation Form Work

Installing Roof Trusses and Sheathing

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Summary

- Employees trained by a Qualified Person
- Designate employee on site as Competent Person
- Inspect scaffold daily
- Follow manufacturer instructions
- Proper access and stable base
- Use fall protection
- Protection from falling objects
- Comply with all MIOSHA Standards

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ELECTRICAL

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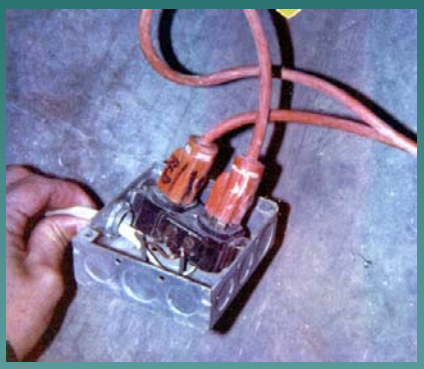
Exposure To Live Parts

- Must guard against exposed live parts over 50 volts
- Must stay at least 10’ away from overhead power lines



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Overhead Power Lines

- No insulated lines
- Contact owner of utility to determine voltage
- Three Options:
  - De-energize & Ground
  - Cover
  - Or have them moved

85

Do You Have A License To Do That?

An employer shall assure that an employee does not engage in the installation activities to which this part applies unless the employee is a licensed electrician, or the employee is working with or under the supervision of a licensed electrician.

86 86

Lock Out / Tag Out

An employee shall not be permitted to be in proximity to any part of an electric power circuit that he or she may contact unless the employee is protected against electric shock by de-energizing the circuit and locking out and tagging it, or unless the employee working on an energized circuit is guarded by insulation, insulated tools, or insulating matting or blankets sufficient to protect against the voltage involved.

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GFCI's In Wet Locations

A portable electric tool used in a wet atmosphere or environment shall be protected by a GFCI.

- Anytime work outside (rain or shine).
- Damp areas (basements, water on the floor).
- Hot, humid, sweaty conditions.

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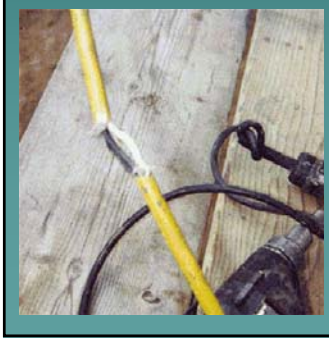
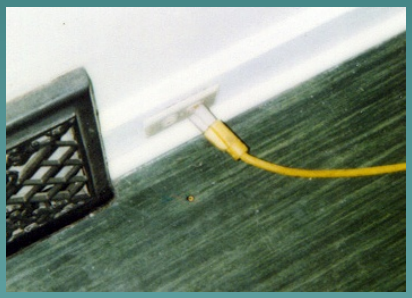
GFCI's In Wet Locations

- Shall be protected against damage
- Have a plug body... to prevent strain



Extension Cords

- An extension cord used with a portable electric tool or appliance shall be a 3-wire type.



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Five Factors for Prevention of Electrical Accidents

- Establish and follow safe work procedures.
- Wear proper personal protective equipment.
- Implement and follow lockout/tagout procedures.
- Comply with MIOSHA, NEC, NFPA.
- Provide training to recognize and eliminate electrical hazards.

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What are YOU going to do to be safer?

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ONLINE RESOURCES

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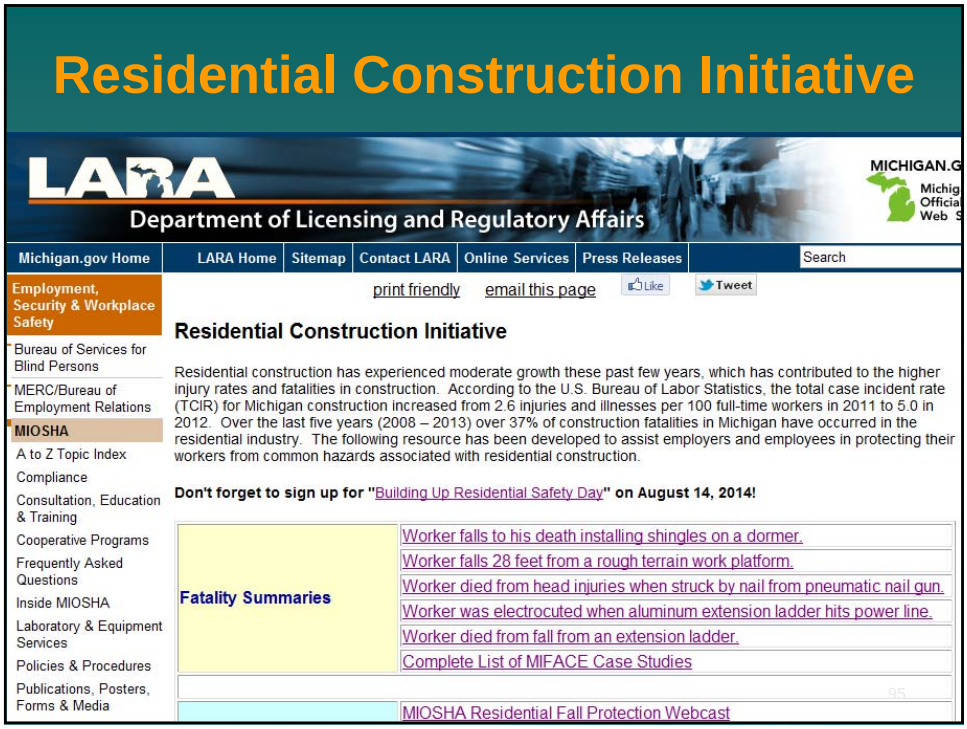

Residential Construction Initiative

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Department of Licensing and Regulatory Affairs

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Employment, Security & Workplace Safety

- Bureau of Services for Blind Persons
- MERC/Bureau of Employment Relations
- MIOSHA
- A to Z Topic Index
- Compliance
- Consultation, Education & Training
- Cooperative Programs
- Frequently Asked Questions
- Inside MIOSHA
- Laboratory & Equipment Services
- Policies & Procedures
- Publications, Posters, Forms & Media

Residential Construction Initiative

Residential construction has experienced moderate growth these past few years, which has contributed to the higher injury rates and fatalities in construction. According to the U.S. Bureau of Labor Statistics, the total case incident rate (TCIR) for Michigan construction increased from 2.6 injuries and illnesses per 100 full-time workers in 2011 to 5.0 in 2012. Over the last five years (2008 – 2013) over 37% of construction fatalities in Michigan have occurred in the residential industry. The following resource has been developed to assist employers and employees in protecting their workers from common hazards associated with residential construction.

Don't forget to sign up for "Building Up Residential Safety Day" on August 14, 2014!

Fatality Summaries	Worker falls to his death installing shingles on a dormer.
	Worker falls 28 feet from a rough terrain work platform.
	Worker died from head injuries when struck by nail from pneumatic nail gun.
	Worker was electrocuted when aluminum extension ladder hits power line.
	Worker died from fall from an extension ladder.
	Complete List of MIFACE Case Studies
	MIOSHA Residential Fall Protection Webcast

Training Resources	Construction Tool Box Talks
	Safety In Residential Construction PowerPoint Handouts
	Residential Construction Initiative Training Calendar
	Complete list of upcoming MIOSHA Training Programs: www.michigan.gov/mioshatraining
Related Standards	Part 45. Fall Protection
	Part 1. General Rules
	Part 6. Personal Protective Equipment
	Part 9. Excavation, Trenching & Shoring
	Part 11. Fixed & Portable Ladders
	Part 12. Scaffolds & Scaffold Platforms
	Part 19. Tools
	Part 32. Aerial Work Platforms
	Complete List of Construction Safety & Health Standards
Policies & Procedures	Residential Construction Local Emphasis Program (COM-14-1)
	Residential Fall Protection Compliance Criteria (COM-04-1R1)
MIOSHA Fact Sheets	Residential Fall Protection
	Threshold Heights Requiring Fall Prevention/Protection
	Dangers of Pneumatic Nail Guns With Contact Triggers
	MIOSHA Fatal Facts: Falls That Kill
	Highlights of the Fall Protection Standard
	Falls - Unprotected Sides, Openings, & Floor Holes

Residential Construction Initiative continued…

	Complete List of MIOSHA Construction Fact Sheets
Other Publications & Resources	Residential Inspection Checklist
	Residential Construction Initiative Letter to Contractors
	Residential Fall Protection Training Manual (SP-35)
	Sample Fall Protection Plan for Residential Construction Work
	Accident Prevention Program (SP-1)
	Additional FAQ's for Construction
	OSHA Fall Protection in Residential Construction Resources
	OSHA Construction eTool

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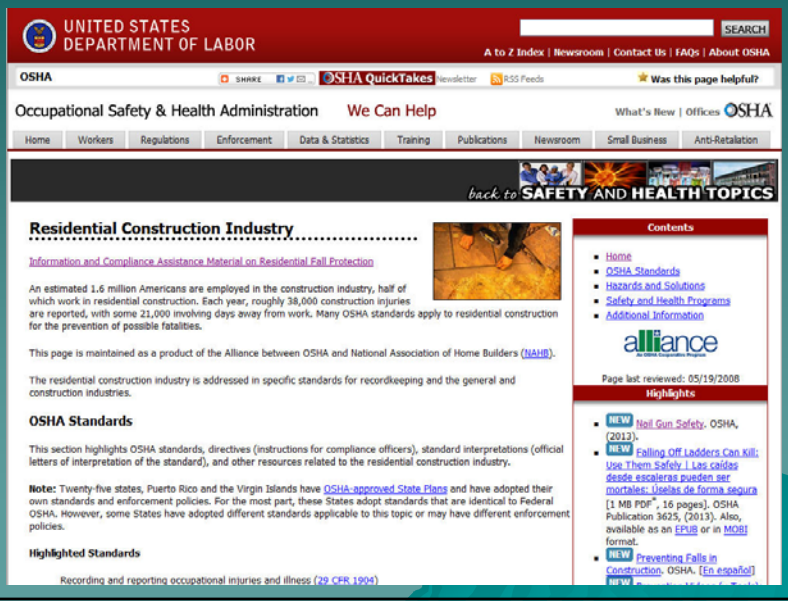
Federal OSHA Website



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Hazards and Solutions

Residential construction has less restrictive building codes than commercial construction. This gives builders the flexibility to build homes to the homeowners' specifications. With so many ways to build a house, residential construction workers face a unique set of hazards and safety considerations. The following links provide information that may be helpful when identifying the hazards of residential construction and solutions to those hazards.

General

- NEW Nail Gun Safety. OSHA, (2013).
- NEW Prevention Videos (v-Tools): Construction Hazards. OSHA.
- Construction. OSHA eTool. A Spanish version is also available. Contains information that helps workers identify and control the hazards that cause the most serious construction-related injuries.
- Hazards of Manually Lifting Balloon Framed Walls. OSHA Safety and Health Information Bulletin, (2005, November 17). Also available as a 58 KB PDF, 3 pages.
- Construction. OSHA Publication 3252-05N (OSHA Pocket Guide), (2005). Also available as a 285 KB PDF, 36 pages.
- Construction Industry Digest. OSHA Publication 2202-09R, (2011). Also available as a 642 PDF, 72 pages.
- Selected Construction Regulations for the Home Building Industry. OSHA, (1997). Also available as a 1 MB PDF, 224 pages. Identifies OSHA standards applicable to the hazards most commonly found at work sites in the residential construction industry and those most likely to have a significant positive impact on the safety and health practices of contractors within this industry.
- Wildfires. OSHA. Includes links to OSHA fact sheets, QuickCards, training programs, and other resources.
- Control of Drywall Sanding Dust Exposures. US Department of Health and Human Services (DHHS), National Institute for Occupational Safety and Health (NIOSH) Publication No. 99-113, (1999, June). Provides information on ways to control and dispose of dust from drywall sanding.
- Construction Safety and Health. National Institute for Occupational Safety and Health (NIOSH) Workplace Safety and Health Topic. Compares accidents in the construction industry to all other industries and lists NIOSH success stories.
- For additional information, see OSHA's Construction Industry Safety and Health Topics Page.

Electrical Safety

- Controlling Electrical Hazards. OSHA Publication 3075, (Revised 2002). Also available as a 349 KB PDF, 71 pages. Provides an overview of basic electrical safety on the job.
- For additional information, see OSHA's Electrical Safety and Health Topics Page.

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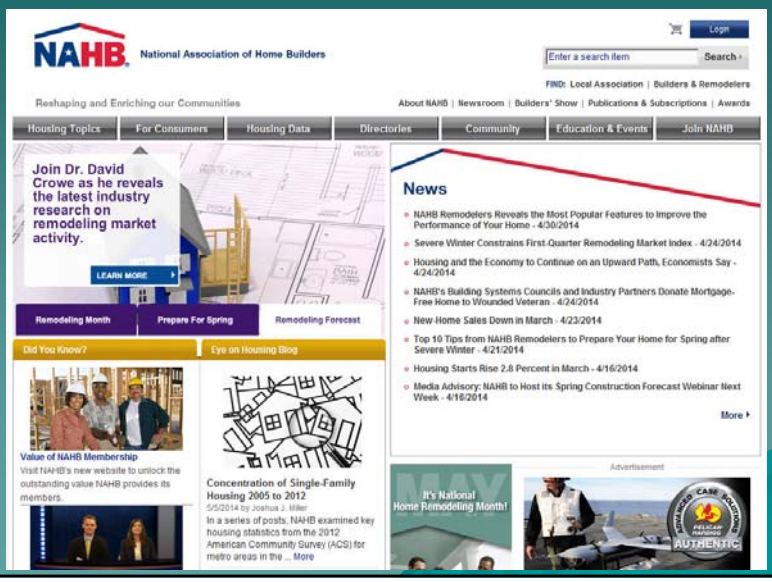
National Association of Home Builders (NAHB)



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Other Resources

- Manufacturers of tools, equipment, & materials
- Construction Consultants
- Internet

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Thank You For Attending This Presentation

Michigan Occupational Safety & Health Administration
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For further information or to request consultation, education and training services, call (517) 284-7720 or visit our website at www.michigan.gov/miosha