



INDIANA DEPARTMENT OF LABOR

Concrete and Masonry



“It’s what we build with”

Objectives

OSHA requirements for concrete and masonry work in construction

Hazards associated with concrete and masonry work

Abatement methods

INDIANA DEPARTMENT OF LABOR



Subpart Q Concrete and Masonry

- Reinforcing steel
- Tools and equipment
- Cast in place concrete
- Precast concrete
- Masonry limited access zones
- Masonry bracing and support

INDIANA DEPARTMENT OF LABOR



Reinforcing Steel

Shall be guarded to eliminate impalement



INDIANA DEPARTMENT OF LABOR



Letters of Interpretation

- Length
- Impalement vs scratch protection
- Horizontal rebar
- Other impalement hazards

INDIANA DEPARTMENT OF LABOR



Requirements

Any length must be guarded



INDIANA DEPARTMENT OF LABOR



Impalement protection



INDIANA DEPARTMENT OF LABOR



Scratch protection



INDIANA DEPARTMENT OF LABOR



Horizontal rebar



INDIANA DEPARTMENT OF LABOR



Vertical to horizontal



INDIANA DEPARTMENT OF LABOR



Anchor bolts



Anchor Bolts

INDIANA DEPARTMENT OF LABOR



Form stakes



INDIANA DEPARTMENT OF LABOR



Plumbing / conduit stubs



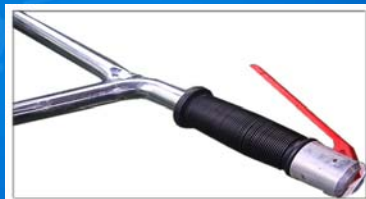
INDIANA DEPARTMENT OF LABOR



Equipment and tools

trowelling machines

Equipped with control switch to shut off power when hands removed from equipment handles



INDIANA DEPARTMENT OF LABOR



Bull floats

- Handles of non-conductive material when contact with energized electrical conductors is a possibility



INDIANA DEPARTMENT OF LABOR



Masonry saws

- Semi-circular enclosure over blade
- Method to retain blade fragments



INDIANA DEPARTMENT OF LABOR



Cast-in-place Concrete

- Formwork designed, fabricated, erected to support all loads



INDIANA DEPARTMENT OF LABOR



Formwork

- Drawings and plans of all formwork available at the jobsite



INDIANA DEPARTMENT OF LABOR



Shoring

- Shoring inspected prior to, during, and after concrete placement
- Damaged/weakened shores reinforced



INDIANA DEPARTMENT OF LABOR



Shoring

- Sills capable of carrying loads, in firm contact and secured with form and foundation
- Re-shoring erected as original forms and shores removed



INDIANA DEPARTMENT OF LABOR



Forms and Shoring

- Removal of formwork or shoring according to plans or drawings
- ASTM test methods for strength, support, weight and loads



INDIANA DEPARTMENT OF LABOR



Pre-cast concrete

- Wall units adequately supported to prevent overturning
- Other hazards



INDIANA DEPARTMENT OF LABOR



- Embedded lifting inserts 4 X load
- Lifting hardware 5 X load



INDIANA DEPARTMENT OF LABOR



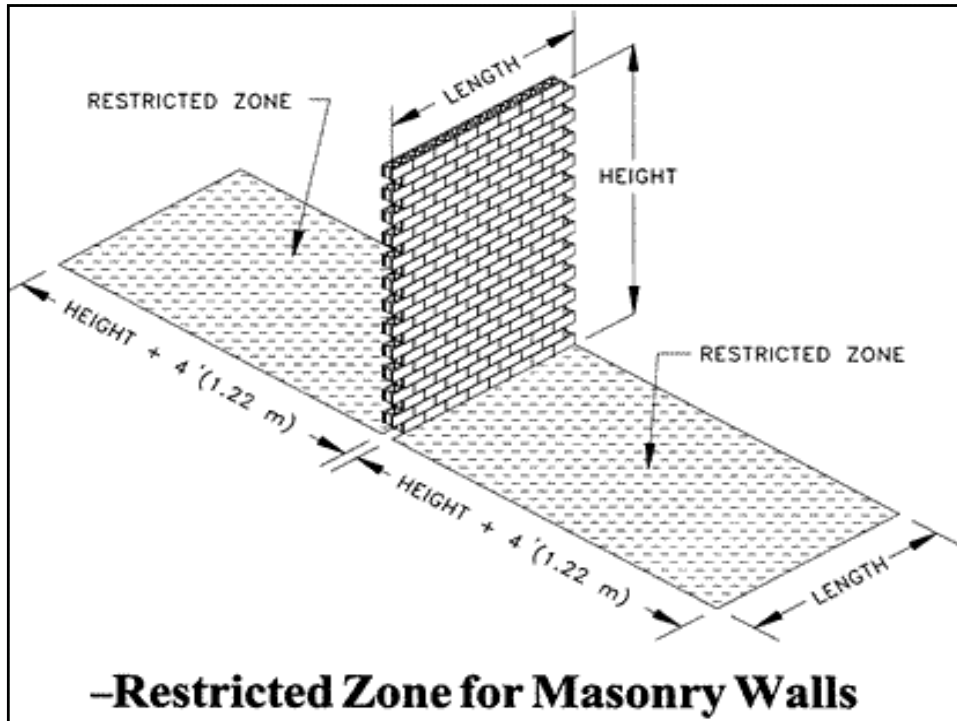
Masonry Construction

Limited Access Zones

- Established prior to construction of the wall
- Equal to the height of wall plus 4 feet
- Run entire length of wall
- Established on unscaffolded side of wall
- Restrict entry to only those engaged in working on wall
- No other employees allowed in zone
- Remain in place until walls are adequately supported from overturning

INDIANA DEPARTMENT OF LABOR





Limited Access Zones

- Responsibility of the employer whose employees are exposed
- Multi-employer worksite
 - Exposing
 - Creating
 - Correcting
 - Controlling

INDIANA DEPARTMENT OF LABOR



Masonry Construction Bracing & Support

- Walls over 8 feet high
- Adequately braced or supported to prevent overturning
- Remain in place until permanent supporting elements in place
- No direction as to number, type, and spacing

INDIANA DEPARTMENT OF LABOR



Performance Standard

- OSHA gives no guidance on bracing to achieve adequately braced or supported wall condition
- Sole responsibility put on contractor on methods used for providing proper bracing and support for walls – must substantiate

INDIANA DEPARTMENT OF LABOR



Bracing and Support

- Wall design
- Weather conditions
- Site conditions
- Construction sequences
- Wind strength, pressure, direction

INDIANA DEPARTMENT OF LABOR



Bracing and Support

- Density and size of block
- Type of mortar
- Pilasters or wall intersections
- Reinforcement bar

INDIANA DEPARTMENT OF LABOR



Types of Bracing

- Single sided
- Double sided
- Cable or tie down



INDIANA DEPARTMENT OF LABOR



Types of Support

- Reinforced masonry
- Internal



INDIANA DEPARTMENT OF LABOR



Brace attachments

- Coil loop insert at wall
- Wedge anchor at floor
- Anchor bolt at wall

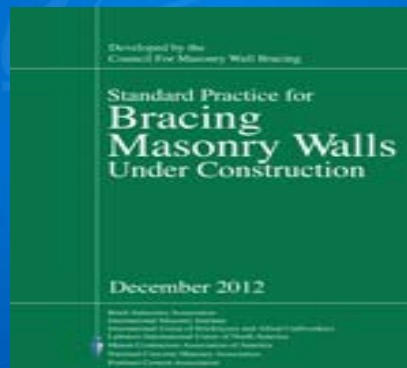


INDIANA DEPARTMENT OF LABOR



Guidelines

“Standard Practice for Bracing Masonry Walls Under Construction” – Mason Contractors Association of America

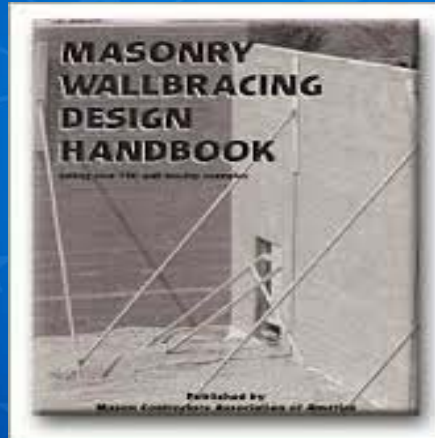


INDIANA DEPARTMENT OF LABOR



Guidelines

- “Masonry Wall Bracing Design Handbook”
Mason Contractors Association of America



INDIANA DEPARTMENT OF LABOR



Guidelines Limited Access Zones

- Both sides of the wall more than 8 feet tall
- Danger signs and tape should be put up
- Evacuated during construction when wind speeds exceed 20 mph – (initial period)
- Evacuated during construction when wind speeds exceed 35 mph (intermediate period)

INDIANA DEPARTMENT OF LABOR



Bracing Guidelines

- 2 braces per panel (distance between control joints) typically 25 feet
- 20% of wall outside of each brace at control joint (panel length x .2 = 5 feet in from control joint)
- Heights vary depending upon reinforcement, grout, size block, mortar

INDIANA DEPARTMENT OF LABOR



INDIANA DEPARTMENT OF LABOR





INDIANA DEPARTMENT OF LABOR



INDIANA DEPARTMENT OF LABOR



Summary

OSHA requirements for concrete and masonry work in construction

Hazards associated with concrete and masonry work

Abatement methods

INDIANA DEPARTMENT OF LABOR



Indiana Department of Labor

INSafe Safety Consultants

John Brunswick

Phone: 317-234-4122

E-mail: jbrunswick@dol.in.gov

Bryan Thais

Phone: 812-888-4054

E-mail: bthais@dol.in.gov

INDIANA DEPARTMENT OF LABOR



Questions ?

INDIANA DEPARTMENT OF LABOR



Links to Federal OSHA interpretations related to concrete and masonry standards

February 6, 1989 – limited access zones and bracing masonry walls ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=19743

July 10, 1991 – limited access zones ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=20331

February 16, 1993 – bracing masonry walls ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=21039

March 18, 1993 – rebar of any length guarded from impalement --

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=21070

March 23, 1994 – large diameter rebar ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=21431

March 24, 1995 – bending rebar to protect from impalement ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=21742

June 25, 1996 – bracing masonry walls ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=22204

May 29, 1997 – mushroom style rebar caps ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=22421

August 3, 1999 – impalement hazards other than rebar ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=23267

March 10, 2006 – horizontal rebar ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=25307

April 24, 2006 – non-rebar impalement projections ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=25353

March 18, 2014 – non-rebar impalement projections ---

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=28955