

Fall from ladder incidents

- A laborer was seriously injured when he fell 25 feet from an extension ladder to the ground ... (Virginia Dept. of Mines and Energy 2002)
- A 59-year-old contractor died of injuries after he fell from a metal extension ladder ... (Washington Dept. of Labor and Industries, 2000)
- A 40 year-old carpenter died after falling about 20 feet from a ladder to the concrete floor below at the construction site ... (NIOSH, 1995)

Magnitude of Fall from ladder incidents

In U.S. ...

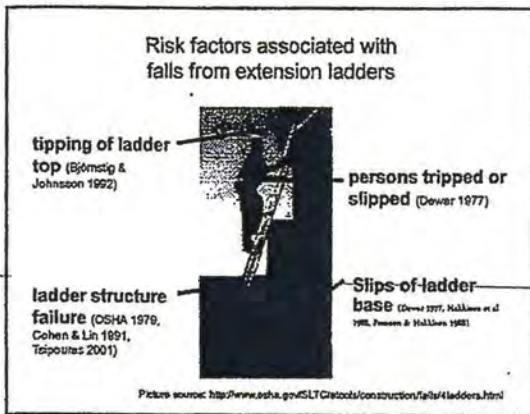
- 133 fatalities occurred in 2004 (BLS 2005)
- 164,000 emergency room-treated injuries yearly due to falls from ladders (CPSC 2004)

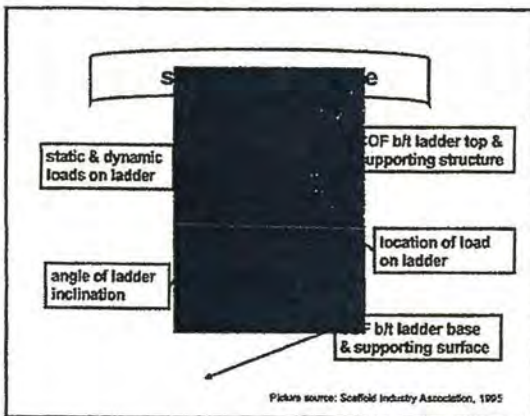


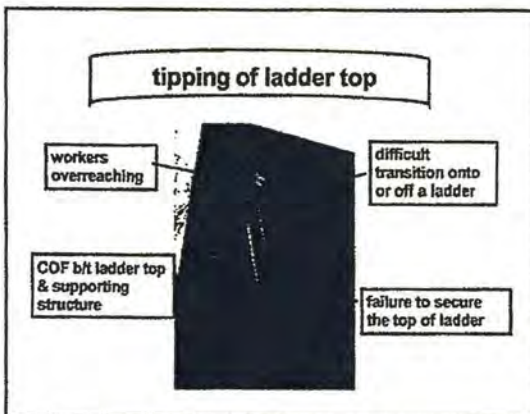
- Risk factors associated with falls from extension ladders
- Current standards on extension ladder safety
- Current measures to control falls from ladders
- Ladder-safety questions remain to be answered

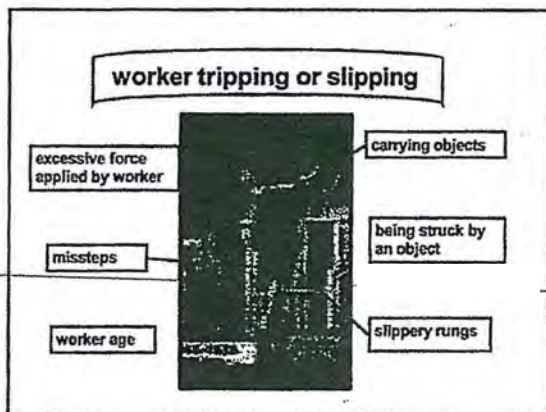
Study method

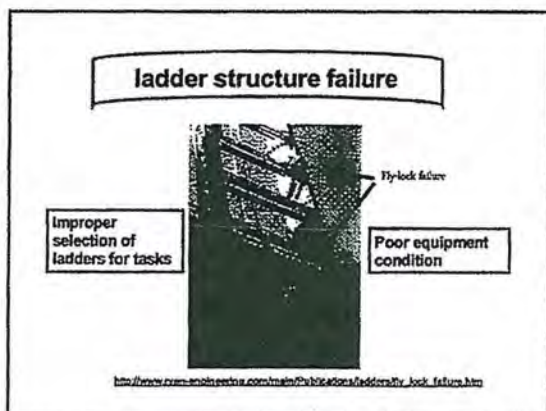
- Literature: safety-related journals, civil engineering Journals, Applied Science & Technology, Medline, Lexis-Nexis, BLS, the E Library for Construction Safety and Health, & OSHA.
- Input from American Ladder Institute (ALI); International Ladder Manufacturers' Convention (ILMAC), a labor union, and two labor-management organizations in the U.S. representing workers who use ladders regularly.
- Ladder safety technologies from the Internet and trade associations were included in the review to accommodate the fact that limited information on the subject was available in professional journals.

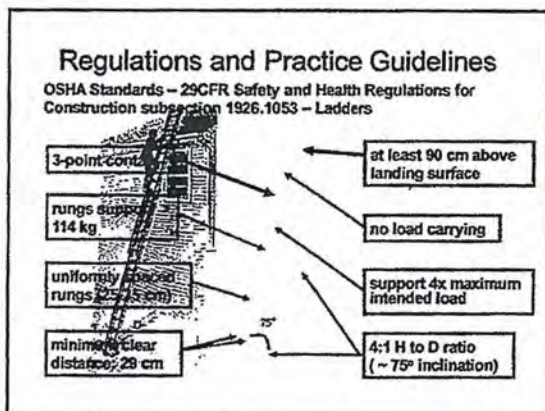






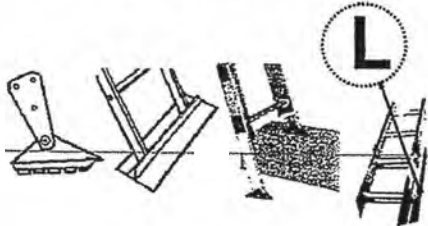




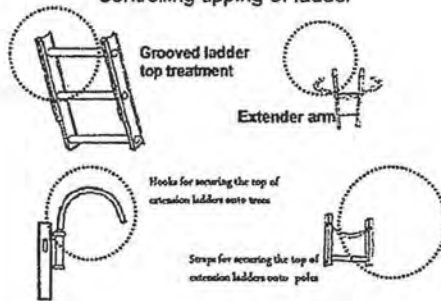


Controlling ladder-base slipping

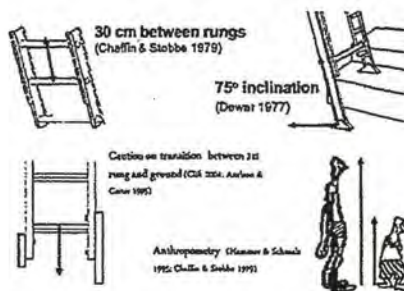
COF between ladder base and support surface
and angle of inclination




Controlling tipping of ladder



Controlling worker tripping and slipping




Controlling ladder structure failure



Regular inspection and maintenance

Use within their rated capacities

Ladder-safety questions remain to be answered
Angle of inclination.



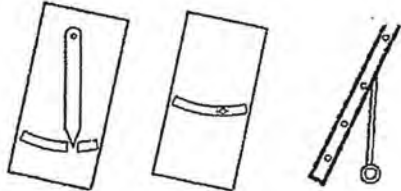
Required COF at the ladder base at 65° inclined angle is 77% higher than that at 75°; workers tend to set at 67° (Chang & Cheng, 2005).

Conventional ladder angle stickers ...
1.5% use rate (Morse & Ryan, 1999).

Perceived slant of a terrain can easily be 20° off (Proulx et al. 2001); align an "L" symbol without a reference can be difficult.

Ladder-safety questions remain to be answered

Evaluates the effectiveness of visual indicators and ladder-base-slipping control devices



Ladder-safety questions remain to be answered

Ergonomic studies aimed at improved rung spacing, design or set-up



Ladder-safety questions remain to be answered

Strategies to transit from a straight ladder to an elevated platform



Ladder-safety questions remain to be answered

Evaluate the effectiveness of ladder accessories and their possible integration into a ladder unit



Ladder-safety questions remain to be answered

Estimate the prevalence of extension ladders with known flaws and why they are still in use



Ladder-safety questions remain to be answered



Novel supplemental fall protection measure, such as airbag vest or materials that can absorb most of the impact energy in a fall incident



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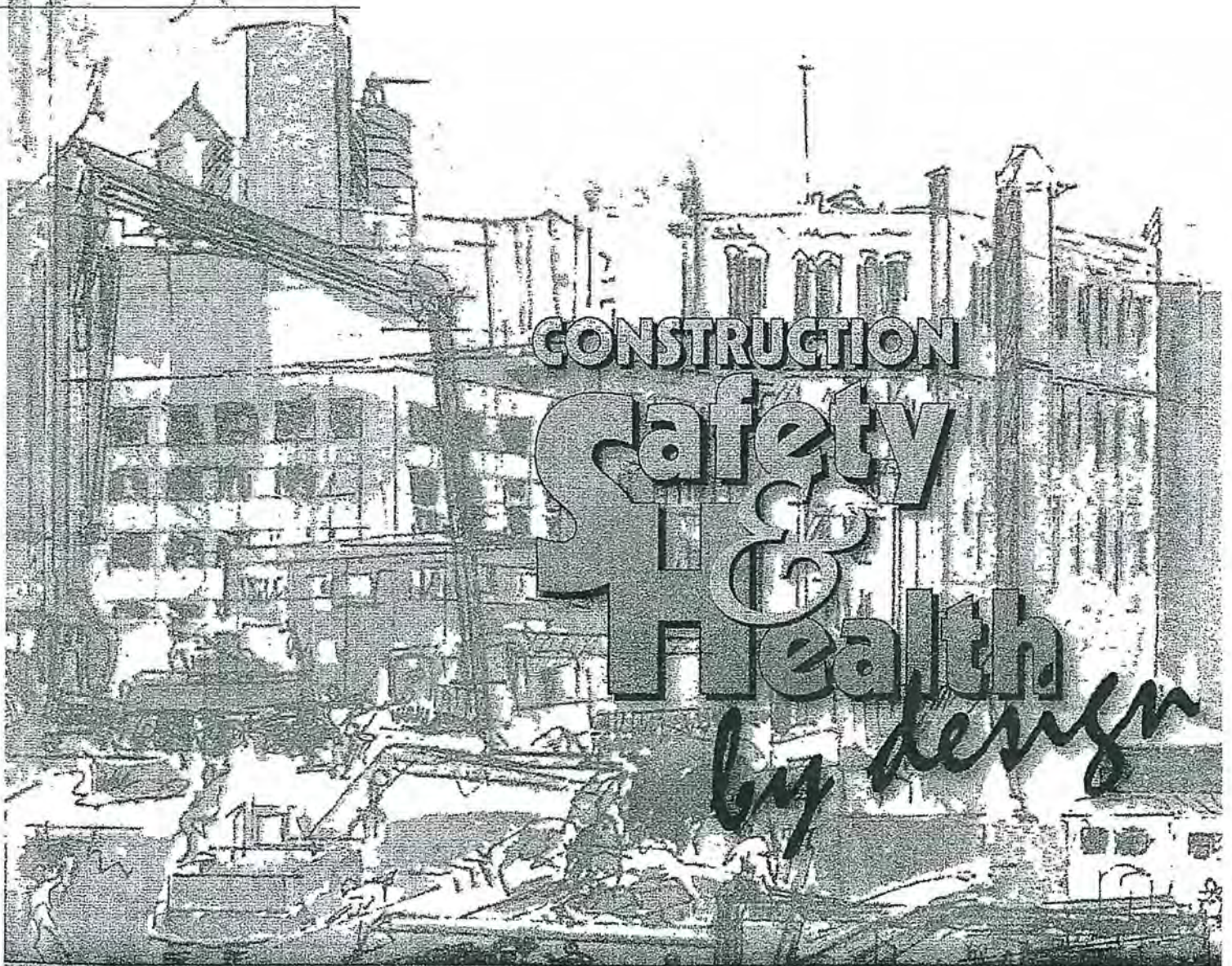
CONSTRUCTION SAFETY

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