

Construction Mobile Hydraulic Crane Safety

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ISSUE – Why care?



- 323 construction crane related deaths '92-06
- For 32%, cause of death = electrocution
- 71% involved mobile, not tower cranes
- New OSHA standards, fully effective 2014





SITUATION – Deaths, Root Cause

- 32% Overhead power line electrocutions
- 21% Crane collapses
- 18% Struck by crane booms/jibs
- 7% Struck by crane loads
- 7% Caught in/between
- 6% Struck by cranes

Notice a trend?



SITUATION – Additional Background

- 1/3 fatalities involved sub-KTRs having ≤ 10 employees
- Death of laborers were most common trade (30%), followed by supervisors/administrators (12%), ironworkers (6%), and mechanics (5%)
- Leading states and # deaths:

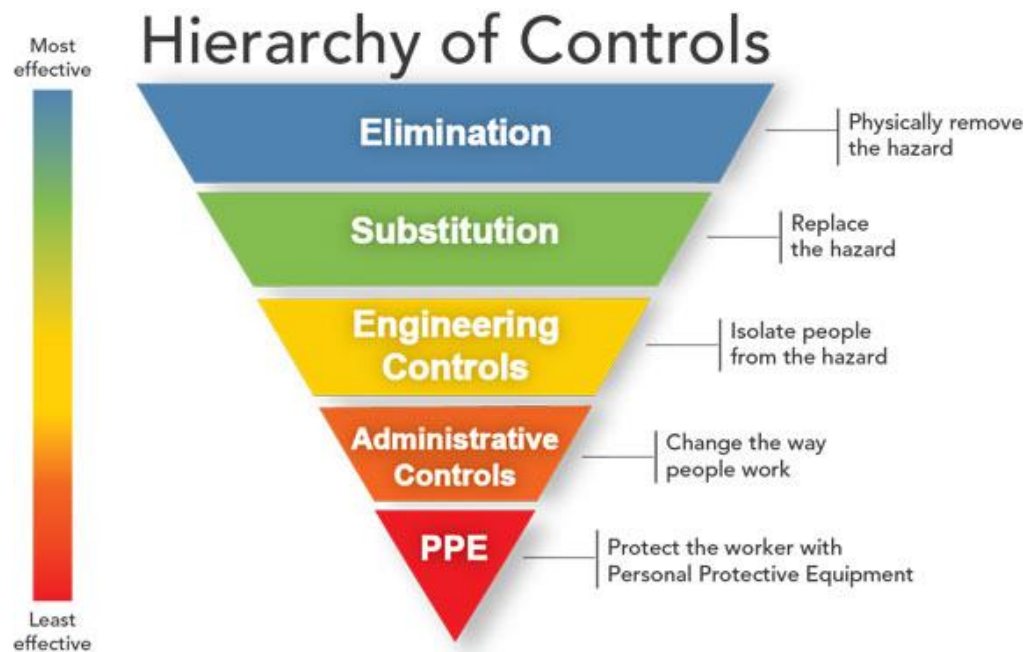
TX (42), FL (27), CA (25), LA (17)

Of these states, only CA required operator license prior to 2010.



ANALYSIS – Elimination Controls

- To prevent electrocution, de-energize the line
- Do not perform work with high winds or lightning
- Other situations—is the lift even necessary?



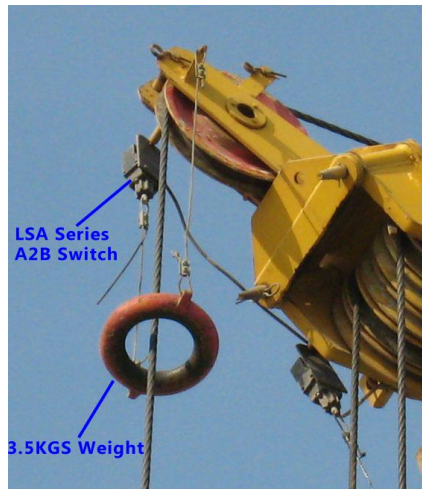
ANALYSIS – Substitution Controls

- Avoid critical lifts (OSHA definition)
 - Greater than 75% rated capacity
 - Multiple crane lifts
- U.S. ACOE EM-385 definition includes above, plus:
 - Lift of submerged object
 - Lift of personnel (use separate manlift or ladder instead)
 - Load tests
 - Non-routine rigging
 - On-rubber lifts (vice using outriggers)



ANALYSIS – Engineering Controls

- Load Moment Indicator (LMI)
 - Boom Angle
 - Boom Extension
 - Weight and % of safe WLL
- Anti-Two Block Device (A2B)



- Rollover Protection System (ROPS)



ANALYSIS – Administrative Controls

- Crane certification
 - Annual load test @ 105% rated capacity
 - Detailed maintenance and inspection records
 - Sign-off by certifying official
- Operator licensing / certification
 - Accredited crane operator testing organization
 - Audited employer qualification program
 - U.S. military
 - Licensing by state or local government
- Qualified crane signal person & riggers
 - Communication SOPs w/ crane operator
 - Standardized hand signal use



ANALYSIS – Administrative Controls (cont.)

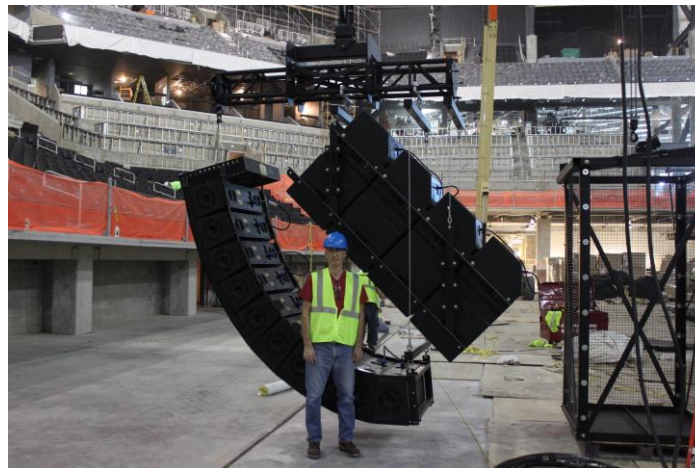
- Audit of Crane Program
- Rigging Gear Inspection
 - Effective June 8, 2011, all slings, chain, synthetic & wire rope, are required to have identification tags/labels permanently attached if sold and used in the U.S.
 - All gear should be marked with manufacturer and WLL
 - Only use equipment intended for overhead use



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CASE STUDIES

- Elimination Control Example—[MCAS Iwakuni Harbor](#)
- Engineering Control Example—[Guam NCC Audit](#)
- Administrative Control Example—USMC Ball Rigging



CONCLUSION

- Crane operations are a significant source of electrocution and struck-by deaths
- Latest OSHA and RCW standards require operator and crane certification; proven administrative control.
- GC can be held responsible for all crane safety on site, whether owned, rented, or sub-KTR operated.
- Maintain a robust and well documented program.

