Survey of Electrician Work Practices

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Methods

- Purpose of this study was to determine energized work practices among construction electricians.
- A questionnaire was mailed to 5,000 IBEW construction electricians
- Completed questionnaires were returned to CPWR

Results

- 1,329 responses were received (26.6%)
  - 127 apprentices (9%)
  - 1,138 journeymen (85%)
- Years of experience as an electrician
  - 1-10 years 22%
  - 11-20 years 26%
  - Over 20 years 52%

Work on Energized Circuits

- Worked on energized (live) circuits in last month
  - Yes 76%
  - No 22%
  - No response 2%
- Voltage ranges when worked live (1006 responses)
  - 240 v or less 66%
  - 240-600 v 53%
  - Over 600 v 6%

Training on Working Live

- Was trained on working on live circuits
  - Yes 79% No 12%
- Who did training? (1051 yes responses)
  - NJATC 61%
  - Employer 61%
  - Consultants 18%
  - Military 3%
- How long was training?
  - 4 hrs or less 39%
  - Over 4 hours 61%

Written Electrical Safety Program for Working Live

- Does employer have written program?
  - Yes 48% No 43%
- Does the written program have the following (632 yes responses)

	600 v or less	over 600 v
Permit system	59%	45%
Specify when can work live	67%	45%
Specify PPE	80%	55%
Specify procedures	75%	52%
Job briefing before start work	65%	50%

PPE Use When Working Live

Type PPE	600 v or less		Over 600	
	Never	Over 50% of time	Never	Over 50% of time
Hard hat	5%	71%	2%	48%
Safety glasses	3%	77%	10%	50%
FR face shield/hood	47%	21%	16%	26%
Insulating gloves	22%	36%	4%	45%
Insulating sleeves	46%	18%	15%	27%
FR clothing	48%	22%	19%	22%
Flash suits	63%	11%	27%	16%
Safety shoes	22%	59%	8%	40%

Equipment Used When Working Live

Type Equipment	600 v or less		Over 600 v	
	Never	over 50% of time	Never	Over 50% of time
Insulated hand tools	11%	67%	3%	47%
Insulated blankets, etc.	20%	44%	4%	44%
Fiberglass Ladders	1%	89%	1%	52%
Temporary protective grounds	22%	43%	4%	44%
Voltage rated instruments	2%	84%	1%	51%

Working on Live Circuits

Specific job duties	All respondents (1329)	Respondents saying "no" to live work (290)
Voltage testing	94%	63%
Operating circuit breaker/fused switch with cover open	85%	47%
Opening hinged covers to expose bare, energized parts	82%	47%
Removing/installing circuit breakers/fused switches	80%	38%
Working on energized parts	80%	29%

Working on Live Circuits

Specific job duties	All respondents (1329)	Respondents saying "no" to live work (290)
Removing bolted covers to expose bare, energized parts	78%	44%
Working on control circuits with energized parts exposed	71%	39%
Installing/repairing light fixture while energized	69%	28%
Connecting equipment to energized panel or bus	60%	21%
Repairing energized circuits	56%	16%

Effect of Written Safety Program:

% wearing PPE over 50% of time under 600 volts

Type PPE	Safety program specifying PPE (503 respondents)	No safety program (576 respondents)
Hard hat	81%	66%
Safety glasses	91%	71%
Rubber insulating gloves	57%	27%
Flame resistant clothing	39%	15%

Effect of Written Safety Program:

% using safety equipment over 50% of time under 600 volts

Type of safety equipment	Safety program specifying PPE (503 respondents)	No safety program (576 respondents)
Insulated hand tools	77%	64%
Insulating blanket, etc.	64%	36%
Nonconductive ladders	96%	91%
Voltage-rated test instruments	93%	85%

Discussion

- Small number of respondents working on energized circuits at over 600v.
- Inaccurate recall? Or were individuals not aware they were working on energized circuits.
- Of those individuals who originally answered "No", nearly 85% eventually indicated that they had worked live in some capacity.
- 576 (43%) of respondents indicated their employer did not have a written electrical safety program.
- Workers performing "High-risk" job duties.
- De-energizing may create a hazard.
- Problems exist for even those employers who do have a written safety program.

Discussion: Policy Recommendations

- **Promote the adoption of an industry standard for a live-work permit system.**
- **Adoption of a standardized training program for contractors.**
- **More specific guidance and regulation from OSHA in the current Construction Standard.**

For Further Information

- Electronic Library of Construction Safety and Health (eLCOSH):

  http://www.elcosh.org
- Center to Protect Workers' Rights

  http://www.cpwr.com

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