Job Exposure Matrix
- for the Electrical Utility Industry

Presented by:
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Rosemead, CA
Outline

• Definitions
• Organization Value
• Hazard/Job Classifications
• Job-based Categorization
• Risk Assessment Basis
• Matrix Examples
• Projected Audience
• Future Plans/Limitations
What is a Job Exposure Matrix (JEM)?

- JHA
  Identification of hazards and exposures utilizing job classifications and tasks.
Value Added

• To reduce hazards/exposures in the work environments through a systematic approach of identifying hazards, based on job classifications and job tasks.
• Education at numerous levels
• Prioritization/rationale for money and effort
Chemical Hazards

Acids/Bases
Ammonia
Arsenic
Asbestos
Sulfur Hexafluoride
Benzene
Cadmium
Carbon monoxide
Chlorine
Chromium
Dusts

Formaldehyde
Hydrogen sulfide
Lead
Mercury
Nitrogen oxides
PCBs
Sodium hydroxide
Solvents
Sulfur oxides
Welding fumes
Ethylene Glycol
Physical Hazards

Heat Stress
Cold Stress
Noise
Electric Current
Ionizing Radiation
Power Frequency EMF
UV (sunlight)
Laser
# Biological Hazards

<table>
<thead>
<tr>
<th>Fungal</th>
<th>Bacterial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungal Allergy</td>
<td>Legionnaires</td>
</tr>
<tr>
<td>Fungal Infection</td>
<td>Sewage, Coliform</td>
</tr>
<tr>
<td>Valley Fever (Coccidio…)</td>
<td>Food poisoning</td>
</tr>
<tr>
<td>Cryptosporidium</td>
<td>Common Infections (staph, strep)</td>
</tr>
<tr>
<td>Viral</td>
<td>Tetanus</td>
</tr>
<tr>
<td>Hepatitis A, B, C</td>
<td>Rabies</td>
</tr>
<tr>
<td>HIV</td>
<td></td>
</tr>
<tr>
<td>Tick-borne</td>
<td></td>
</tr>
</tbody>
</table>
Ergonomic Hazards

Awkward posture
Static posture
Lighting
Vibration
Materials handling
Repetitive Motion
VDT
Tools
Trip and Fall
Psychological Hazards

Responsibility/Supervisory
Isolation
Extended Shifts/Fatigue
Occupational Categories (SEG)

- SCE/EPRI

Administrative
Apprentice Electrician
Auto/Plane Mechanic
Clerical Field Workers
Drivers
Electrician
Engineer
Equipment Operator
Field Service Reps
Field Supervisors
Groundmen
Line Workers
Lineman Apprentice

Machinist
Maintenance Workers
Manager, Mechanics
Meter Reader
Officer Supervisors
Other Technician
Plant and Equipment Operator
Porter
Representatives
Security
Technical/Professional
Welder
Task Breakdown

• Identified Job Tasks through interviews
• Reviewed tasks for significant hazards
• Meter Readers (confined spaces?)
Risk Assessment Basis

• Regulatory
  – OELs (PEL, TLV)
  – Carcinogens

• Known Illnesses
  – Workers Comp
  – OSHA Incidents

• Potential Exposure
  – Professional/Institutional Knowledge
  – Report of Exposure/Complaints
Rankings

(Health Effect Severity) (Exposure Potential) = Overall Risk

- Total Risk = Negligible, Low, Moderate, High (1-4)

- Assessed Individually, Highest risk used
Health Effect Severity Ranking

1 – Nuisance effects.

2 – Irritation, Discomfort, Possible sensitization.

3 – Possible/suspect Carcinogen, Severe short-term health effects.

4 – Toxicity (neuro-, organ-specific, etc), Known Carcinogen, Mortality.
Likelihood of Exposure

- Professional judgment, exposure sampling data (relative to the IAL), frequency of exposure
- Internal Action Level (IAL) of 50% the PEL/TLV

1 – Exposure very unlikely: Exposure very rare, and/or NO data above IAL
2 – Exposure unlikely: Exposure infrequent, or some data above IAL (shows possible need for re-sampling)
3 – Exposure possible: Exposure infrequent, and some data above IAL
4 – Exposure known: Exposure Frequent and some data above the IAL.

4 - Known Worker’s Comp Claim or OSHA Incident
Risk Rating

1 – 2  Negligible Risk
3 – 6  Low Risk
6 – 9  Moderate Risk
12 – 16 High Risk
## Physical Hazards

<table>
<thead>
<tr>
<th>Physical Hazards</th>
<th>Meter Readers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Stress</td>
<td>Deserts</td>
</tr>
<tr>
<td>Cold Stress</td>
<td>Winter areas</td>
</tr>
<tr>
<td>Ionizing Radiation</td>
<td></td>
</tr>
<tr>
<td>EMF</td>
<td></td>
</tr>
<tr>
<td>Microwave/RF</td>
<td></td>
</tr>
<tr>
<td>UV (sunlight)</td>
<td>Walking routes</td>
</tr>
<tr>
<td>Noise</td>
<td></td>
</tr>
<tr>
<td>Electric Current</td>
<td>MR 1 change meters</td>
</tr>
</tbody>
</table>
# Viral Factors

<table>
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<tr>
<th>Viral</th>
<th>Meter Readers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis A,B,C</td>
<td>Wilderness areas</td>
</tr>
<tr>
<td>HIV</td>
<td></td>
</tr>
<tr>
<td>Tick-borne</td>
<td></td>
</tr>
<tr>
<td>Rabies</td>
<td>Dog bites</td>
</tr>
</tbody>
</table>
## Ergonomic Factors

<table>
<thead>
<tr>
<th>Ergonomic Factors</th>
<th>Meter Readers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awkward posture</td>
<td>Awkward access to meters</td>
</tr>
<tr>
<td>Static posture</td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td></td>
</tr>
<tr>
<td>Materials handling</td>
<td>Meter usage, twisting meter seals</td>
</tr>
<tr>
<td>Repetitive Motion</td>
<td></td>
</tr>
<tr>
<td>VDT</td>
<td>Holding dog-stick or umbrella</td>
</tr>
<tr>
<td>Tools</td>
<td></td>
</tr>
<tr>
<td>Trip and Fall</td>
<td>Uneven yards and sidewalks, wet/icy surfaces</td>
</tr>
</tbody>
</table>
Prioritizing Efforts

- Using data (often incomplete), prioritize where efforts are needed.
- Given a Risk v. Difficulty of Controls, work from both ends of difficulty of controls.
Real Benefit

A value-decision tree, a basis to either:

- Change or not change Programs
- Check to verify that effective corrective measures are implemented
Sequence of Change

1. ID hazards and exposures
2. Prioritize
3. Learn, gather additional info
4. Change Situation; Incorporate Controls into Programs
5. Train to the change
6. Self-Audit
Limitations

• Level of Detail is an issue
• Limited List
• IH only, will incorporate Safety
• Synergistic, Additive effects not considered
• IH database limited
Future Plans

- Standardize - Set the uniformity/format
- Refine techniques
- Collaborate through EPRI
  - Share experience and knowledge
  - Pool data industry-wide
  - Create an industry focus group
- Possibly influence future regulation through empirical data (e.g. hex chrome)
Acknowledgments
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