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REPORT TO EEA ON EDISON ELECTRIC INSTITUTE OCCUPATIONAL SAFETY AND HEALTH CONFERENCE - APRIL 2017

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HEALTH + SAFETY
ASSET MANAGEMENT
PROF DEVELOPMENT

Report to EEA on EEI April 2017 Occupational Safety & Health Conference

Attendees: Harvey O'Sullivan & Michele Wilkinson
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Events Attended:
The Edison Electric Institute Spring Safety & Health Conference, held in Sugar Land, Texas from April 24th to 26th, 2017.
The Edison Electric Institute Contractor Safety Summit, held in Sugar Land, Texas on April 27th, 2017.

Edison Electric Institute
The Edison Electric Institute (EEI) website describes the EEI as:
The Edison Electric Institute (EEI) is the association that represents all U.S. investor-owned electric companies. Our members provide electricity for 220 million Americans, and operate in all 50 states and the District of Columbia. As a whole, the electric power industry supports more than 7 million jobs in communities across the United States. In addition to our U.S. members, EEI has more than 60 international electric companies as International Members, and hundreds of industry suppliers and related organizations as Associate Members.

Organized in 1933, EEI provides public policy leadership, strategic business intelligence, and essential conferences and forums.

EEI Safety & Health Conference
The EEI holds two Safety & Health Conferences per year. Attendee numbers in Sugar Land were approximately 135, representative of all sectors. The Conference is equally about industrial hygiene and this formed the second of the two streams. There was also a trade exhibition.

Many of the conference topics were relevant to NZ, and even though there were some not so relevant topics, e.g. those associated with North American legislation and OSHA, these were of interest value and had relevance in providing an insight into how the topics are handled, and how OSHA is managed/responded to.

Key Conference topics and presentations included;
- Safety Benchmark Networking Workshop
- Keynote address - Todd Conklin (Human & Organisation Performance Consulting)
- Keynote address - William McArthur (Johnson Space Centre)
- Washington Update, on a number of current issues receiving the attention of the legislators, including NFPA 70E and a number of regulatory issues.
- Assessing the Potential for Risky and Unsafe Work Behaviour Among Job Applicants and Employees
- Hazard identification/Near miss – Industry Panel
- Supervisor Safety Leadership Skills Training – Industry Panel
- Neuromuscular Stimulation and Muscular Skeletal Disorder
- Distributed Generation – Safe Work Procedures
- Industrial Hygiene Plans – Industry Panel
- Labor/Management Safety Partnerships
- Changing Landscape in Safety: Labor's Perspective

- Beryllium
- Alternate Methods for Respirator Fit Testing
- Collision Avoidance Technology Review
- Recognition, Evaluation, and Control of Legionella in Building Water Systems
- OSHA ET&D Partnership: OSHA's perspective
- Contractor Safety Performance
- Hexavalent Chromium issues
- Citations/Accidents Review (Several presentations on recent accidents)

EEI Contractor Safety Summit

The EEI Contractor Safety Summit is held annually, although it will in future be a part of the Safety & Health Conference itself. The Summit covers some of the same topics as the Conference and is specific to contracting matters.

Key Summit topics included (in addition to some topics referred to above);
- Heat Stress
- Silica

Observations on Focus for Safety & Health Management in North American ESI

Due to the regulatory environment in North America there is significant focus from the industry on the OSHA rules and what OSHA is targeting at a point in time. At this Conference the focus areas appeared to be;
- OSHA Recordable incidents which may result in penalties, sanctions etc
- Silica
- Beryllium

The emphasis on what interested OSHA appeared (from my perspective) to be leading the industry to target the topic areas emphasised by OSHA at the expense of other potential high risk areas.

For example, arc flash was an area of focus some years ago but that is now reduced on the OSHA radar, hence did not attract any specific discussion at this Conference. Comment from an attendee spoken to is that it is resolved via the PPE requirements, distance and remote operation, hence no further action is required and it is an operational matter. Some companies have fitted a time delay on local operation of equipment.

It is acknowledged that the focus on OSHA Recordables should keep attention focussed on where the injuries are arising, noting that the high frequency incidents are in the 'slips, trips and falls' zones. Comment was that in the fossil and nuclear sectors OSHA Recordables are increasing, but in all other sectors they are declining.

The bulk of attendees at the Conference appeared to be from within the Safety & Health Departments of the companies represented, hence their focus targeted the regulatory requirements.

An objective for this Conference from a NZ perspective was to identify what OSHA is focussing on as they are current issues and are likely to also be targeted by WorkSafe, e.g. silica.

EEI Safety Programmes

The EEI gave an update on the various EEI safety programmes they operate, including the collection and processing of statistical data.

The statistical data is made available on-line to participating companies. For 2016 they had 72 participating companies, who had a work hours base of over 866,000,000 hours. (Note that this is for their own employees, but most have their own maintenance crews). The Total Recordable Incident Rate (TRIR) for 2016 was 1.22 (number of recordable incidents per 100 full time employees), and 14 fatalities.

There is a focus on serious injury and fatality (SIF) statistics, in line with OSHA focus, but it appears to be a means of separating serious injuries and fatalities from all OSHA Recordable.

Motor vehicle accident statistics also receive significant attention.

Priority Issues for NZ ESI

From an assessment of the topics presented at the Conference the following topic areas are identified as currently being of relevance and importance to the NZ ESI in the sense that they are topic areas that development work is needed on in NZ to determine the level of exposure and the necessary controls (if any). The topic areas are;

- Beryllium
- Silica
- Hexavalent chromium

Many other topics had coverage of relevance to NZ, but are topics that are currently being addressed.

Keynote Speakers

1. Todd Conklin

   Todd is an inspirational speaker and gave a captivating presentation on his approach to safety management and safety concepts. Todd is a consultant in organisational development and human performance safety, and consults and gives presentations internationally.

   (Note: He recently spoke at the Safeguard Workshop in NZ and is understood to be consulting to Contact Energy)

   Many of Todd's presentations are available on-line and the presentation at Sugar Land was consistent with his standard material.

   Key quotes noted from his presentation included;

   - The workers are the solution to safety issues
   - Operational success is that safety is not the absence of accidents; it is the presence of capacity/defences.
   - While compliance with rules has achieved a major reduction in accident frequency, as have design factors, a fatality or serious event can still occur because it may not be like other events, there were no near misses leading to it, etc
   - Workers are as safe as they need to be, without being too safe, in order to be productive; until they're not.
   - Need to shift thinking about events from 'why' to 'how'.

- Need to deal with the grey area between what is clearly safe and what is clearly unsafe (after an event safety is clear)
- Drift and accumulation can occur, i.e. what occurs is not exactly what is expected to happen. If the essential safeguards are not sufficient the fatality prevention zone is lost.
- Workers fail when we make it easy to do work incorrectly and hard to do work reliably
- Accidents aren't preventable. We manage the consequences so as to fail safe.
- Stop when unsure/start when certain, i.e. when this fails what will keep me from harm?
- Manage preparation for uncertainty

2. William McArthur
   Bill McArthur is the Director of Safety and Mission Assurance for the Johnson Space Centre (NASA). He is a veteran of four space flights, including six months on the international space station.

   Bill spoke extensively about risk and safety in the space flight sector.

   Of note Bill commented that only 17% of serious injuries or deaths are by decision of the person injured or killed. Over 60% of the relevant decisions are made at project manager level or higher.

3. Felix Lopez
   Felix is an industrial organisational psychologist and the President of Lopez & Associates. He gave an address on assessing the potential for risky and unsafe work behaviour among job applicants and employees.

   The key point of this address was that safe workers need to have 'ability', 'adaptability' and 'compatability', and without strengths in all three the worker would have a reduced likelihood to perform safely.

<u>Industry Panels</u>
A number of industry panels were included in the Conference as follows.

1. Hazard Identification and Near Miss
   There is a move to the term 'good catch' in lieu of 'near miss'.

   Emphasis is on simply being informed of the issue, even if the detail is not provided, i.e. keeping the reporting simple and quick.

2. Supervisor Safety Leadership Skills
   Key notes from Eversource Energy presentation:
   - Leadership and culture need to co-exist
   - Human performance recognises;
     - People are fallible, even the best make mistakes
     - Error-likely situations are predictable, manageable and preventable
     - Individual behaviour is influenced by organisational processes and values
     - People achieve high levels of performance based largely on the encouragement and reinforcement received from leaders, peers and subordinates.

    - Events can be avoided by understanding the reasons mistakes occur and applying the lessons learned from past events.
- Some leadership styles work and some don't.

3. Brownfields
   A 'brownfield' is a property that has known past or current environmental impacts and which may have access or use restrictions'.

   Presentations from two companies described their management of requests to work on brownfields sites, including their preparations for such work. Issues arise in relation to remediation, with third party site owners not wanting the remediation to be carried out because of disruption to their activities – sometimes there is no option but to continue activities, and carry out remediation in tandem. Other issues might also arise, including where remediation has been carried out, but not to the appropriate or necessary standard or level – for e.g. remediation may have been carried out up to 3 feet underground, but 5 feet is needed for power poles.

   Questions of liability may also arise, if sicknesses or illnesses occur at some point.

4. Industrial Hygiene Plans
   a. Key notes from NiSource presentation;
   - Industrial hygiene is a science and art devoted to the anticipation, recognition, evaluation, prevention and control of those environmental factors or stresses arising in or from the workplace that may cause sickness, impaired health and well-being, or significant discomfort among workers.
   - Established a 3 year plan.
   - Industrial hygiene hazards identified by NiSource are;
     - Noise
     - Ionising radiation NDT
     - Cumulative trauma disorders
     - Musculoskeletal disorders
     - Temperature extremes (heat & cold)
     - Indoor air quality
     - Non-ionising radiation (EMF, MW, UV, RF)
     - Infectious agents (Blood borne pathogens, zoonotic disease)
     - Chemical – pesticides, herbicides
     - Chemical - organic solvents
     - Chemical – halogenated solvents
     - Chemical – mercury
     - Chemical – chromium
     - Chemical – hydrazine
     - Chemical – acids (sulphuric, hydrochloric)
     - Chemical – caustics (sodium hydroxide)
     - Chemical – PCBs
     - Air contaminants – ammonia
     - Air contaminants – lead
     - Air contaminants – welding fumes
     - Air contaminants – asbestos
     - Air contaminants – coal dust
     - Air contaminants – ionising radiation

        - Air contaminants – carbon monoxide
        - Air contaminants – dust
        - Air contaminants – crystalline silica
        - Air contaminants – arsenic (flyash, fume)
        - Air contaminants – cadmium
        - Air contaminants – chromium
        - Air contaminants – other (vanadium pentoxide, sulphur hexafluoride, solvents, oil mists, PCB, exhaust, sulphur dioxide, hydrogen sulphide, nitrogen oxide, hydrogen chloride, hydrogen, LPG, Natural Gas, Natural Gas odorant.)
    - Presentation includes a 3 year plan.
    - Need to prioritise as there are many exposures to manage.

b. Key notes from Duke Energy presentation;

- Presentation outlined the Duke Energy Industrial Hygiene Programme
- Identifies occupational health risks
- Includes qualitative risk assessment and quantitative sampling
- Programme utilises the AIHA's guide "A Strategy for Assessing and Managing Occupational Exposures"
- Qualitative assessments use a risk matrix
- Quantitative assessments based on field sampling

c. Key notes from Exelon presentation;

- Exelon presentation describes their corporate industrial hygiene programme at a high level. Programme similar to Duke.
- Managing and developing the planning process has inherent issues regarding obtaining quality data. Some of this is done externally – in which case penalty clauses are included in the contracts with external organisations. However, if it is carried out internally, controls need to be in place to ensure accuracy.
- Concerns can arise with report writing – especially mistakes with wrong data, or wrong names. With internally carried out work, laboratory reports can be reviewed against the written reports to ensure data is recorded accurately.

<u>OSHA/ET&D Strategic Partnership</u>

A Deputy Regional Administrator for OSHA gave a presentation on the strategic partnership between OSHA and the electricity industry T&D collective, referred to as the National Electric Transmission and Distribution Partnership.

Key points;

- The partnership was signed in 2004.
- Impacts approx. 70% of T&D industry
- General goals include;
    - Analyse accident and incident data and statistics
    - Identify common cause factors related to fatalities , injuries and illnesses
    - Develop recommended 'Best Practice' guidance for each identified cause
    - Develop 'Best Practice' implementation strategies
    - Identify training criteria for workers, including training to promote industry cultural change
    - Develop effective methods of implementation

- Partnership website is www.powerlinesafety.org
- Fatalities, injury rate, DART rate, OSHA recordables have all declined
- Executive Committee is comprised of CEOs of member companies or their nominated person. They meet 2x per year.
- Further detail set out in a 'white paper' available through the 'press room' tab of the website.

Safety Benchmark Networking Workshop

This was a four and a half hour workshop at the start of the Conference and is a regular workshop at the Safety & Health Conferences. Specific Topic Areas included:

(a) Sprains/Strains

Sprains/strains are a significant statistical injury, particularly with an ageing workforce and other factors which are common in NZ also. Reported that 37% of all OSHA recordable injuries are sprains and strains.

The discussion on sprains/strains included the use of counter measures such as body mechanics/ergonomic evaluation and training, reinjury prevention programmes, injury prevention classes etc. Assessment programmes included functional movement screening in order to provide personal programmes for workers which included stretching programmes. This is reported to have reduced injury incidence by 50%. A particular injury cause is laying cables in cubicles with insufficient space.

It was also reported that as companies downsize there is less opportunity for people to move into other roles. Workers are also more reluctant to move off the trucks as they earn $100k/yr in field work.

There were many references to the use of personal trainers, and 'walking wounded', as well as the use of Occupational Health Nurses as the first response in order to limit the information on injuries available to management.

(b) Vehicle Safety/Driver Safety

Discussion was based on a set of questions.

Notes;

- Post accident drug testing performed as well as random.
- Some companies do a compulsory phone record check of company phones. (Check of private phones is voluntary)
- Issues raised re vision as there is no general testing.

(c) Job Observations

Job observations were reported to now be a core safety programme element among higher performing utilities, as identified by the EEI. However, an industry specific data set to gauge implementation is not available, hence discerning best practice is 'challenging'.

Notes from discussion;

- The term 'conversations' is now used.
- One reported 3300 records but they can't be collated or trended.

- There is a major reluctance to document negative practices
- Poor skill set for performing observations

(d) General Topics

Discussion on 'walking surfaces' as there was a recent (2015) change in OSHA rules regarding gaps between walking surface and structures, e.g. between catwalk and boiler wall. Permissible distance was not clear, but 11" is generally used. However, corners are an issue but 11" is still used.

OSHA has moved against chains across floor opening and is now requiring swing gates.

A boiler is sometimes de-classified as a 'confined space' based on air movement. This is to reduce the compliance requirements.

Pole handling with pole tongs has limited use and only on pole piles.

Use of gloves with LV – OSHA requires that sleeves are used with gloves.

Washington Update

A significant focus of the Conference is on activity in Washington, i.e. OSHA.

(a) NFPA 70E

NFPA 70E is being reviewed. The presentation focussed on the requirements for determining PPE for arc flash exposure, i.e. revised Annex H. Annex H.2 and Table H.2 are to provide a simplified approach when using 130.7(C)(15) Arc Flash PPE Category Method to determine minimum arc flash PPE requirements.

(b) Beryllium

OSHA published a proposed rule on Beryllium (Be) in 2015 and the final rule has an effective date of May 20, 2017 and a compliance date of March 12, 2018.

The industry has concerns with the OSHA requirements, particularly with respect to the specificity and tight limits.

Materials with trace content of Be are described as 'materials containing <0.1% Be by weight where the employer has objective data demonstrating that employee exposure to Be will remain below the action level as an 8 hour TWA under any foreseeable conditions.' Trace element materials are exempt from the controls.

OSHA has extended the controls to exposure to dermal contact with Be. A Be work area includes areas where employees can be exposed to airborne Be or where there is the potential for dermal contact with Be. (Concern was expressed with regard to what 'contact' means.)

Process and operations identified as relevant to the ESI included;

- T&D; switchyards – copper-Be components
- Boiler insulation removal
- Boiler cleaning operations
- SCR cleaning operations

- Aluminium work and aluminium welding
- Fleet management operations
- Coal pile operations

(c) Legal Matters

An extensive presentation was provided by a lawyer who monitors and lobbies the regulator, and is up to date with current issues. These included;

- The record keeping rule had been amended to require larger businesses to report injury and illness records electronically. OSHA will post the data on the internet. Provisions were included to enable employees to report injuries without retaliation.
- There are current court cases on the silica rule with Labor arguing it doesn't go far enough and industry arguing it goes too far. The enforcement date for the silica standard for construction has been deferred 3 months, to 23/9/2017.
- Fixed ladders more than 24ft (7.3m) above lower level must have ladder safety or personal fall arrest system installed. New and repaired ladders to be compliant by late 2018, and all ladders compliant by 2036. This means phasing out of cages and wells on ladders.
- At ladderway openings self-closing gates must be used (chains not permitted)
- Step bolts must be corrosion resistant, uniformly spaced (12 – 18 ins), 4.5 ins wide, 7 ins clearance at back, and bolts fitted after 1/1/17 must support four times max intended load.

<u>Specific Topic Presentations</u>

(i) Buck Ladder Tether

The 'Buck Ladder Tether' is produced by Buckingham. This is a ladder mounted lifeline system allowing the user to ascend and descend a ladder while attached at all times. It includes a system for securing the ladder to the pole prior to ascending.

(ii) Distributed Generation

Consolidated Edison presented on the safe work procedures applied within their network where many consumers have installed PV. The presentation focussed on the installation safety rather than whether work on the network is carried out live or de-energised, but the speaker later confirmed that all LV network work is carried out live as they would not be able to provide an adequate isolation for de-energised work.

(iii) Neuromuscular Skeletal Disorders

Presentation by Lovely Krishen, Biosysco. Key notes included;

- Musculo-skeletal disorders include work-related diseases and injuries, such as carpal tunnel syndrome, tendonitis, and stress related injuries such as RSI.
- MSDs are the most common injury type in electric power workers, accounting for over 50% of all injuries, and nearly 44% of medical costs.
- The workplace should have a comprehensive ergonomics and compliance programme in place; research is focusing on acute injuries, and disrupting the cumulative effect of work.
- A number of techniques are being considered such as self-monitoring (wearing heart count monitor for example), and non-invasive techniques such as using electrical stimulation on the site of the injury/pain. In particular SIGMA Q technology is being assessed - it is at the experimental stage in the USA, but

widely used in Europe. It uses a combination of electrical charges and ultrasound to provide treatment. Its advantages include its ability to simulate walking and running (which is carried out in spa baths) and can be used as a post work treatment, but it can also be used for monitoring purposes, e.g. vests, cushions etc can be embedded.

- There are currently some research gaps with the SIGMA Q technology which is now the subject of research and development – such as how the cumulative effect of its application is measured (fatigue/failure approach); the design of wearable technology, and how it might interact with PPE, a stressful working environment, spa treatment at the worksite.

(iv) Beryllium

See also coverage of Be under Washington Update above.

Two presentations:

- Beryllium and the Skin by speaker from National Institute for Occupational Safety and Health, Morgantown WV.
- OSHA Beryllium Standard, by speaker from Materion (Global supplier of specialty materials including alloys, beryllium products etc)

Key points (derived from both presentations);

- Be is a contaminant in coal and oil. It is also naturally occurring in many mineral and clay based materials. Also found in concrete, bricks, cement, abrasive grinding/cutting wheels, welding rods, solders, paints.
- Adverse health effects include Be sensitization and chronic Be disease.
- OSHA announced a rule on Be in Jan 2017, with a delay in its effective date to May 2017.
- Final rule includes provision for;
    - Exposure assessment
    - Methods for controlling exposure
    - PPE and equipment
    - Housekeeping
    - Medical surveillance
    - Hazard communication
    - Recordkeeping
- Be work area includes areas where there is potential for dermal contact
- OSHA rule recognises importance of skin exposure to Be. OSHA justification is that insoluble Be particles can penetrate or dissolve through intact skin and cause Be sensitisation. Has been found that Be sensitisation alone has no clinical symptoms. (Be sensitisation reported to occur in about 1% of general population not occupationally exposed to Be)
- Need to protect workers skin from Be.
- Significant implications for disposal of coal slag.
- Industry has significant concerns over OSHA position and the evidence for it.

(v) Collision Avoidance Technology

Presentation by CenterPoint Energy on their programme to reduce vehicle accidents using collision avoidance technology.

Key points:

- From 2013 to 2015 the number of preventable collisions increased.
- Selected a collision avoidance technology called Mobileye.
- Mobileye's research claims reduction in road accidents by up to 45%
- Windshield mounted camera and processor
- System focuses on immediate alerts for unintentional lane departure, following time, forward collision and pedestrian collision.
- Mobileye does not have reporting capability
- CenterPoint installed separate record capturing system (GPS Insight) and collected data is used to;
    - Determine effectiveness of the devices in changing driver behaviour
    - Determine trends in driver behaviour
    - Coach for individual driver improvement.
- Achieved 21% reduction in preventable collisions from 2015 to 2016.

(vi) Hexavalent Chromium

Two speakers (CMS Energy and Duke Energy) gave presentations on hexavalent chromium, particularly from welding fumes.

Key points included;

- CMS Energy programme focussed on controlling exposure during welding, including ventilation and respirator requirements.
- CMS Energy exposure potential based on welding process, consumable or base metal, coatings, job duration and working conditions.
- Duke primary focus is thermal cutting, welding and activity that disturbs paints or coatings which contain hexavalent chromium
- Duke evaluated its historical data
- Duke analysis and industry data suggests;
    - TIG has lowest exposure
    - MIG – too few samples
    - Stick and flux core – higher (could be very high)
    - Thermal spraying – very high
    - High % of stick welding of low (2%) chrome (CrMo alloy) exceeded action level
    - Respirators required for any stick welding on any chromium.

(vii) Heat Stress

A speaker from Duke Energy gave a presentation titled 'T&D Heat Related Incident Review'

Key points included;

- Duke formed a team in 2016 to identify and evaluate common causes of heat related stress incidents from 2015 in the T&D and gas operations groups.
- Five categories of recommendations resulted;
    - Hydration policy
    - Education
    - Active caring
    - Incident investigation
    - Communications and alerts.

- 17 incidents in 2015, of which 9 were recordable
- 5 incidents to employees, 12 to contractors. All 9 recordable were contractors.
- Temperature range during day of incidents
    - 7 under 91°F (33°C)
    - 8 between 91 & 95°F (33 to 35°C)
    - 2 over 96°F (35.5°C)
- Top 5 behaviours that may have contributed to heat events were identified as;
    - Workers did not come to work sufficiently hydrated
    - Workers left to their own monitoring of hydration do not sufficiently hydrate
    - No hydration coach assigned to the crew to monitor water intake
    - Supervisor did not ask specific questions of the crew at the start of the day.
    - Several workers had previous heat stress incident.

(viii) Silica

Three speakers gave presentations on respirable crystalline silica (RCS) and the management of exposure to the dust. It was noted that OSHA has issued a standard to regulate the exposure to RCS, with an effective date of Sept 2017.

Key requirements of the OSHA standard include;

- A Permissible Exposure Limit (PEL) and an Action Level (AL)
- An exposure assessment is required when exposure above the AL can reasonably be expected
- Written exposure control plans are required
- Competent persons
- Access control is required
- Specified exposure control methods for 18 common construction tasks/equipment
- Medical surveillance requirements
- Acceptable (and unacceptable) housekeeping practices are specified
- Specific training requirements
- Record keeping requirements for monitoring, objective data and medical surveillance.

Other key points relating to compliance with the standard;

- If engineering and work practice controls are insufficient they must still be used in conjunction with respiratory protection
- Wet methods, HEPA filtered equipment and ventilation are the primary means to reduce silica exposure
- The 18 common construction tasks are mostly the use of power tools. For the listed tasks the standard lists;
    - The equipment/task
    - Engineering and work practice control method
    - Required respiratory protection and minimum assigned protection factors

A representative of Hilti (Power Tool Manufacturer) gave a presentation on a range of tools produced by them which provide for wet or dry work with RCS.

Report by: Harvey O'Sullivan