Establishing and Implementing an Effective Industrial Hygiene Program

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OVERVIEW

1. What is Industrial Hygiene (IH)?
2. Why do I need an IH Program?
3. Basic Components
4. Common Mistakes
5. Keys to Successful Implementation
6. An Example
What is Industrial Hygiene?
Industrial Hygiene (IH) is defined as:

The discipline of anticipating, recognizing (identifying), evaluating and controlling health hazards in the working environment, with the objective of protecting worker health and well-being and safeguarding the community at large.
Principles of Industrial Hygiene

FOUR TENETS OF PRACTICE

1. Anticipation
   What is the potential hazard?

2. Recognition (Identification)
   What is the nature of the hazard?

3. Evaluation
   What is the extent of the exposure?

4. Control
   What are the required controls?
Principles of Industrial Hygiene

**FOUR TENETS OF PRACTICE**

The hygienists role is to, by utilizing these four tenets, reduce or eliminate the workplace hazards.

1. **Anticipation**

   Anticipate potential hazards associated with a specific process or, for example, introduction of a new material in the workplace.

2. **Recognition** (Identification)

   Recognize the anticipated hazards, which is closely related to the anticipation. The recognition process requires knowledge of toxicology, chemistry, ergonomics, engineering and other branches of science.
3. Evaluation

Evaluate if the exposure risk that has been identified is considered significant or not. Qualitative and quantitative assessment of a worker’s exposure.

When a potential exposure to hazardous agents cannot be avoided, implement control measures with the purpose to reduce or eliminate the exposure.
Principles of Industrial Hygiene

FOUR TENETS OF PRACTICE

4. Control

- **Elimination/Substitution**: Eliminates the exposure before it can occur.
- **Engineering Controls**: Requires a physical change to the workplace.
- **Administrative & Work Practice Controls**: Requires worker or employer to DO something.
- **Personal Protective Equipment (Including respirator)**: Requires worker or to WEAR something.
Principles of Industrial Hygiene

FOUR TENETS OF PRACTICE – OCCUPATIONAL HEALTH

- Work Activity
  - Exposure
    - Disease
    - Occupational Hygiene
  - Occupational Medicine
    - Occupational Health
Why do I Need an IH Program?
1. IMA Team members: Darrell Smith, IMA-NA (Co-Chairperson); John Kelse, R T Vanderbilt; and Jim French, U. S. Borax Inc.
MSHA Team members: Mike Hancher (Co-Chairperson), Bill Wilson, and Michael Franklin
“Interpretation of MSHA data has caveats. MSHA data are limited by underreporting of illnesses. Few disease categories are recorded; many occupational illnesses are of long latency, and miners might not develop symptoms during their working years, further decreasing the likelihood of disease reporting… As a result, analysis of MSHA data does not provide meaningful information regarding the health status of MNM miners.”

Very little information is available regarding chronic disease risk factors, occupational diseases, as well as nonfatal illnesses that cause substantial morbidity among MNM miners.
Global Estimates of the Burden of Injury and Illness at Work 2012…

- Globally 2.3 million deaths due to occupational circumstances.
- Occupational Injuries = 318,000 deaths
- Work Related Diseases = 2,022,000 deaths

<table>
<thead>
<tr>
<th>Disease</th>
<th>Percentage of Workers Effected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Related Cancer</td>
<td>32%</td>
</tr>
<tr>
<td>Work Related Circulatory Diseases</td>
<td>23%</td>
</tr>
<tr>
<td>Cardiovascular and Stroke / Communicable Disease</td>
<td>17%</td>
</tr>
<tr>
<td>Occupational Accidents</td>
<td>18%</td>
</tr>
</tbody>
</table>

*Takala et al., Global Estimates of the Burden of Injury and Illness at Work in 2012.*
## Global Estimates of the Burden of Injury and Illness at Work 2012...

<table>
<thead>
<tr>
<th>Country</th>
<th>Acute Fatalities Reported</th>
<th>Fatal Work Related Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>465</td>
<td>11,330</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>5,214</td>
<td>95,808</td>
</tr>
<tr>
<td>Australia</td>
<td>207</td>
<td>6,962</td>
</tr>
<tr>
<td>Totals (Top 27 Industrialized Nations)</td>
<td>11,850</td>
<td>306,988</td>
</tr>
</tbody>
</table>

*Takala et al., Global Estimates of the Burden of Injury and Illness at Work in 2012.*
Occupational disease was identified as one of the top ranked hazards in the 2014 underground mining sector risk assessment completed as part of the Mining Health and Safety Prevention Review.
“While traumatic fatality incidents in the mining sector have declined substantially over the past several decades, deaths related to occupational illness have not.”

“Working in a closed underground environment, miners can be exposed to airborne hazards, such as diesel emissions and silica, putting them at higher risk of developing occupational illness. The Review heard that both supervisors and workers need better education and training so they are more aware of the seriousness of airborne health hazards in underground mines.”
The Ministry of Labour to require that mining employers address the priority hazards identified in the risk ranking exercise:

- Require employers to prepare a formal plan to manage hazards that cause occupational illness, including requirements for worker and supervisor training and communication.
Components of an IH Program
Basic Components of IH Program

Program with stated purpose, scope, responsibilities, measures & procedures, resources

Training (hazard information, control comprehension / application)

Engineering & Administrative Controls

Personal Protective Equipment

Worker Exposure Assessment

Medical Monitoring (required for silica control programs)

Record keeping
Basic Components of IH Program (cont’d)

- Identify a person responsible to oversee program
- Preliminary exposure assessments to identify potentially problematic exposures
- Identify suitable control measures
- Select, provide & maintain respiratory protection for interim / short term use, if necessary
- Identify hazard areas
- Provide orientation & ongoing training to workers
- Maintain records & make available for inspection
Common Mistakes of IH Programs
Common Mistakes

**NO PLAN**
Reactive approach to IH problems (i.e. complaints, orders, claims, etc.)

**LACK OF KNOWLEDGE**
Competency of IH staff, incorrect methods, equipment, media, etc. Incorrect interpretation of results

**INADEQUATE RISK ASSESSMENT**
Qualitative/Quantitative
Undefined similar exposure groups
Defensible data

**ANALYSIS PARALYSIS**
Time and resources spent on overly rigorous assessment programs resulting in massive data sets. Overinclusion of agents in SEG-driven assessment.
5

Keys to Implementation
Keys to Successful Implementation

1. Buy-In
2. Resources
3. Educate
4. Act
5. Measure
6. Report

This diagram illustrates the key steps in a successful implementation process.
Let’s Get it Right!

A QUICK EXAMPLE

Document and Communicate

ID Hazards

ID and Execute Actions

Assess Worker Exposure

Evaluate Risk
Getting it right

- Identify Workflows and Potential Agents
- Review job tasks – Watch them work
- Interview Workers
- Identify Exposure that Require Characterization
- Create Similar Exposure Groups (SEG’s)
- Sample and Refine Similar Exposure Groups
- Evaluate Data and Determine Control Effectiveness
How many samples

Table 1: NIOSH Recommended Sample Size

<table>
<thead>
<tr>
<th>Size of SEG</th>
<th>Recommended Number of Samples</th>
</tr>
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<tbody>
<tr>
<td>&lt; 6</td>
<td>all</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>8 - 11</td>
<td>7</td>
</tr>
<tr>
<td>12 - 14</td>
<td>8</td>
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<td>15 - 18</td>
<td>9</td>
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<td>19 - 26</td>
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<tr>
<td>27 - 43</td>
<td>11</td>
</tr>
<tr>
<td>44 – 50</td>
<td>12</td>
</tr>
<tr>
<td>50+</td>
<td>14</td>
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- Need to have statistically valid data set (95% UCL). The data needs to be representative, reproducible and readily interpretable.

- Exposure profiles need to be appropriately characterized.

- Baseline data will serve as the starting point for determining which occupational exposures require action and prioritizing which ones to address first.
THE CHALLENGE
Occupational diseases are real and preventable

THE SOLUTION

• Having an effective Industrial Hygiene Program is your best “frontline” defense to preventing occupational disease

• Employers need to understand workplace exposures so they can eliminate them or effectively control them. Risk Management

• Qualitative risk assessment is the starting point for understanding your workplaces potential exposures, without this step you can’t have an effective program or sampling plan.

• Education is essential, all workplace parties need to be aware of chronic hazards and how to eliminate/control them.
Thank you! Questions?

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