Crystalline Silica
and
Diesel Particulate Matter

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Crystalline Silica

- Current Regulatory Status
- Recent Developments
- Ongoing Research
Current Regulatory Status

• Occupational Safety and Health Administration (OSHA) and Mine Safety and Health Administration (MSHA)

• Current Permissible Exposure Limit is
  
  \[ \text{PEL} = 10 \text{mg/}(\% \text{ Silica} + 2) \]

• OSHA lists silica as a priority for promulgating a comprehensive standard
Recent Developments

• American Conference of Governmental Industrial Hygienists (ACGIH) lawsuit.
  – ACGIH prevailed but much was learned on how ACGIH develops its TLVs. Those involved with the litigation report:
    • Closed and secretive committees
    • Conflict of interests of TLV committee members
    • Too much influence from DOL members on committees
    • Failure to fairly address all the science available on a substance
Ongoing Research

- American Chemistry Council’s Crystalline Silica Panel
  - Updated mortality study of Vermont granite shed workers
    - Will be the most definitive study regarding silica and disease
    - Incorporates newly found dust exposure data from the 40’s, 50’s and 60’s
    - Expected to be completed late in 2009

- Currently evaluating an impinger/cyclone conversion factor study to complement the mortality study
Diesel Particulate Matter

• Current Regulatory Status

• Recent Developments

• Ongoing Research
Regulatory Status

- MSHA is enforcing a 160 µg/M³ exposure limit for worker exposure in non-coal underground mines.

- Analytical method reliability for DPM is questionable at these low levels.

- Expect citations of the lower DPM standard to be challenged in court
Recent Developments

• A new NSSGA/MSHA sampling workshop for DPM was initiated this month at a Roger’s Group UG mine

• The aggregates industry has not embraced the use of exhaust particulate filters

• Focus has been on ventilation, newer engines and Biodiesel
Ongoing Research

- National Institute for Occupational Safety and Health and the National Cancer Institute DPM mortality study is nearly complete

- Real Time analyzer for DPM

- Smoking and DPM
Vulcan, Univ. Minn and NIOSH DPM Real Time Analyzer Project

• Purpose
  – Need for quicker turnaround on measuring DPM control effectiveness

• Objective
  – Determine the correlation between NIOSH 5040 DPM method and TSI real time analyzer
Instrumentation

3 AIM 510 photometers with impactors
3 SKC cassettes with impactors; 1 cassette with 3 filters others with 2
1 MSA cassette with impactor
MSA ELF pumps used with MSA and EC/OC samples
Regression Analysis

**Regression Equation 1**

\[ y = 0.2076x - 0.0039 \]

\[ R^2 = 0.8355 \]

**Regression Equation 2**

\[ y = 0.1215x - 0.0044 \]

\[ R^2 = 0.8314 \]
## Total Carbon and Smoking

**Units in Severity Ratio (exposure/PEL)**

<table>
<thead>
<tr>
<th>JOB</th>
<th>Smokers</th>
<th>Non-smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blasters</td>
<td>1.35 (12)</td>
<td>0.97 (9)</td>
</tr>
<tr>
<td>Bolters</td>
<td>3.64 (6)</td>
<td>1.19 (6)</td>
</tr>
<tr>
<td>Drillers</td>
<td>1.78 (7)</td>
<td>0.89 (13)</td>
</tr>
<tr>
<td>Truck Drivers</td>
<td>2.05 (7)</td>
<td>0.54 (15)</td>
</tr>
<tr>
<td>Loader Oprs.</td>
<td>1.36 (5)</td>
<td>0.59 (11)</td>
</tr>
<tr>
<td>Scalers</td>
<td>1.76 (8)</td>
<td>1.27 (9)</td>
</tr>
</tbody>
</table>
Total Carbon and Smoking

Conclusion

Smoking cessation for underground miners is good for their health and good for your compliance!