Using Assessment Technology to Direct Worksite Interventions: Practical Solutions to Dust Control

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Agenda

- Worker perspective on health, decision making
- Integrating technology into H&S interventions
- Quick fixes identified for dust control
Workers’ perceived knowledge and barriers about respirable dust exposure and prevention

• Silica exposure primary health risk – but under control.
  • “It’s risky but not risky for me because...”

• Seeing dust increases awareness.
  • “It’s easy to change, but then you get comfortable, fall back into old habits...”

• Dust you can’t see is more harmful.
  • “I don’t feel unsafe while I’m doing......but there’s not much I can do.”

Research shows that using technology within H&S interventions can increase autonomy and job control.
Video exposure monitoring (Helmet-CAM) technology for dust control
EVADE 2.0 Software
(Enhanced Video Analysis of Dust Exposure)
Pre and post surveys, interviews, & dust assessments to identify dust sources, develop control measures

Step 1

Step 2

Step 3
Identified exposure sources, behavioral practices, and organizational/engineering modifications ($n = 48, 5$ mine sites)

### Table 1

<table>
<thead>
<tr>
<th>Mined commodity</th>
<th>Number of participating workers</th>
<th>Job positions (as described by the workers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial minerals/ aggregates</td>
<td>11</td>
<td>Loader operator, rail loader, lab technician, dry maintenance, clean-up, mine operator</td>
</tr>
<tr>
<td>Metal</td>
<td>9</td>
<td>Assay lab technician, maintenance, blaster</td>
</tr>
<tr>
<td>Industrial minerals/ aggregates</td>
<td>9</td>
<td>Maintenance, electrician, utility/process operator, load truck operator</td>
</tr>
<tr>
<td>Industrial minerals/ aggregates</td>
<td>12</td>
<td>Bagging operator–bulk and mini bags, clean-up, maintenance</td>
</tr>
<tr>
<td>Industrial minerals/ aggregates</td>
<td>7</td>
<td>Bagging operator–bulk and mini bags, lift truck operator, load truck operator</td>
</tr>
</tbody>
</table>
Changes made by individual workers
Effects of Contaminated Work Clothing

Working inside LEV system changing bags

Over a 12-minute time segment, worker 1 respirable dust exposure was 3 times higher than his co-worker.
Dusty clothes, dirty hands, and dust-laden cloth seats in operating equipment, light fleet vehicles, and office chairs.

Reduce your dust exposure
Cover or replace cloth seats

Did you know?
Cloth chairs in mobile equipment, break rooms, and offices can hold high levels of dust.
Use vinyl or leather seat covers or plastic chairs when possible.

Reduce your dust exposure
Clean dust from work clothes

Did you know?
Using clothes cleaning technology throughout the workday can reduce your exposure to respirable dust by up to 88%
Launder clothes post-shift, including sweatshirts and coats, and use leather (not cloth) gloves to avoid dust buildup.
Folding bulk or mini bag loading collars toward the worker resulted in brief, elevated exposures.

Did you know?
Folding bulk or mini-bag loading collars away from your breathing zone can reduce peaks in respirable dust exposure up to 92%.

When tying, fold bag collars away from you.

Findings based on NIOSH field studies. To learn more, visit go.usa.gov/x0CS9
Fugitive dust while maneuvering dust-laden objects cause short exposure spikes

Worker Fixes

• Housekeeping in dust-laden areas such as beltlines.
  • cleaning and maintaining the belt better than previous visits resulted in lower exposures.

• Water areas more frequently.
• Storage for screens and other objects (i.e. bags) to help prevent accumulation and liberations.
Example – Spraying down mill areas /housekeeping tasks
Example – Experimenting with nozzles to reduce fugitive dust when spraying
There was a statistically significant increase in workers’ proactive behaviors from Time 1 (M = 4.84) to Time 2 (M = 5.10), t (33) = -2.545, p < .016 (two tailed).

The mean increase in proactivity scores was .268. The eta squared statistic (.16) indicates a large effect size.
Changes made by the organization
Inaccurate perceptions of protection in enclosed rooms

Exposures in some enclosed rooms showed exposures up to 400 mg/m$^3$

Improved filtration and pressurization systems for dry labs.
Elevated exposures in dry labs/splitter rooms (*without fan*)
Using splitter shack *(with fan)*

Increased awareness of proper ventilation
Old haul trucks with little filtration/pressurization in cabs
Performance Metrics & Impact: From the first visit to follow-up visit, facility changed their haul trucks.
Thank You!

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