Prevention of dust exposure by implementing a prevention culture in the demolition sector

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Presentation

- Project idea and motivation
- The demolition sector
- The Program Theory, methodology and design
- Developing an audit toll
- Result from questionnaire and interviews
- Conclusion and perspective
- ….. and further
Background

25 years research in prevention culture, employee involvement and strategies to reach SME’s

Networks as a means to regulate OHS -
Project proposal was developed in partnership with the sector

Dust Prevention – KTE – partnership project – funding DK-WE-Fund

Danish health research documented high risk of dust exposure in the sector and high prevalence of COPD

International research on the risk of obstructive lung disease from inhalation of quartz dust*)

*) NEPSI 2006, silica-safe.org etc.
COPD

• the fourth most common cause of death in DK

• 4000 cases a year

• Estimated 10% related to dust exposure

• Occurs primarily when aged 60+
## Monitoring of exposure to respirable dust: Demolition workers (mg/m3)

<table>
<thead>
<tr>
<th>Demolition workers</th>
<th>Measurememts</th>
<th>Time in average</th>
<th>GM (mg/m3)</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual work</td>
<td>2</td>
<td>118</td>
<td>3.40</td>
<td>3.30-3.50</td>
</tr>
<tr>
<td>Mechanical work</td>
<td>4</td>
<td>207</td>
<td>0.43</td>
<td>&lt;0.05-3.30</td>
</tr>
<tr>
<td>Handling waste</td>
<td>3</td>
<td>131</td>
<td>5.06</td>
<td>3.50-10.0</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>116</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>143</td>
<td>1.06</td>
<td>&lt;0.05-10.0</td>
</tr>
</tbody>
</table>
Knowledge Transfer Exchange (KTE) in collaboration with a sector

• The aim is to develop a practical and applicable tool to prevent dust exposure

• To utilize existing experiences from safety culture research, dust prevention practice and job practice from the sector (knowledge transfer)

• The sector is involved in defining the problems, developing the tools and strategies, in assessing the practical use and in disseminating within the sector (knowledge exchange)


Reardon R, Lavis J, Gibson J. From research to practice: A knowledge transfer planning guide. Institute for Work and Health (IWH), Toronto, Ontario 2006
The demolition sector

- The demolition sector in DK consists of ‘the good guys, the bad guys & the ugly ones’
- The good guys: 15 companies in a section of the Danish Construction Association (employers association)
  - From 25 - 200 employees
  - Use of hired workers – mostly migrant workers
  - Economically dependent of environmental regulation
  - Changed from a ‘Wild-West - sector’ to a respectable business since 2000
- An educational program: ‘Skilled demolisher’ was established in 2005

Demolition workers:
- Sanitation (removal of toxic and environmentally unfriendly substances)
- Stripping teams
- Machine operators
- Manual ground workers
Program-theory of the project

Target Group
- 15 demolition companies
  - Management
  - OHS professional
  - Site manager
  - Demolishers

Intervention
- Development and test of a plan and audit tool
  - Identify exposures
  - Plan prevention
  - Evaluate/audit
  - Implementation

Output: "Handle the dust" ("APP tool")

Outcome 1
- Within the project timeframe
- Expected outcomes:
  - Companies and employees experience improved ability to prevent dust exposure – as an integrated part of the daily work
  - Dust plan
  - Training of site manager
  - Supporting network
  - Audit
  - Information on health risk

Outcome 2
- Near future
- The audit tool is found relevant and in frequent use
- Reduction in dust exposure

Outcome 3
- Future
- Reduction in cases of COPD

Final test in second leg of interventions:
- Final test in second leg of interventions:
Methodology and design

Start up: Selection of 8 involved companies

Development of audit tool: Development of prototype and testing in 4 (3) companies

Test and adjustment: Full scale test in 6 specific demolition tasks (4 companies)

Final test: Final test and dissemination

- Support to OHS-P and SM Interview Site-M Interview management
- Support, Questionnaire for emp. Interview Site-M and OHS-P
- Support, (Questionnaire for emp) Interview Site-M and OHS-P
Development of the Audit tool – creating a plan for each specific demolition task

Step 1: The site
Draw a map of the site:
- Access roads
- Waste containers
- Transport routes and Equipment handling?

Step 2: Dust producing tasks
- Define all processes and timeline
- Categorize in relation to type and volume of dust

Step 3: Machines and aids
- What machines, tools, aids and equipment are needed?
- When and how are they available?

Trin 5: Environment
Other workers/people on the site?
Weather conditions?

Trin 6: Define prevention strategy
What types and volume of dust exposure?
What tools, equipment etc. must be available – when?
Which tasks and processes need special attention?
What training and instruction are needed – when and whom?

Trin 7: Control and audit
Who is performing the audit
How often?
Briefing and debriefing?
Support to Site – M in using Audit tool

Trin 4: Employees
- How many and who are at special risk of dust exposure?
- Are they skilled and instructed?
- Define need for training and instruction

Specific task e.g. demolition of former factory building
AUDIT tool: ‘Handle the dust’ checklist - App

<table>
<thead>
<tr>
<th>Personal protective equipment</th>
<th>1. Personal protective equipment</th>
<th>1. Personal protective equipment</th>
<th>1. Personal protective equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate signage for PPE</td>
<td>+ 8 -</td>
<td>+ 1 -</td>
<td>+ 1 -</td>
</tr>
<tr>
<td>Safety glasses</td>
<td>+ 2 -</td>
<td>+ 1 -</td>
<td>+ 1 -</td>
</tr>
<tr>
<td>Safety gloves</td>
<td>+ 5 -</td>
<td>+ 2 -</td>
<td>+ 2 -</td>
</tr>
<tr>
<td>Safety masks</td>
<td>+ 6 -</td>
<td>+ 0 -</td>
<td>+ 0 -</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order and tidiness</th>
<th>2. Order and tidiness</th>
<th>2. Order and tidiness</th>
<th>2. Order and tidiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste containers placed</td>
<td>+ 3 -</td>
<td>+ 0 -</td>
<td>+ 0 -</td>
</tr>
<tr>
<td>Appropriately</td>
<td>+ 0 -</td>
<td>+ 5 -</td>
<td>+ 5 -</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate vacuum cleaners</td>
<td>+ 4 -</td>
<td>+ 2 -</td>
<td>+ 2 -</td>
</tr>
<tr>
<td>Dust reduction</td>
<td>+ 3 -</td>
<td>+ 1 -</td>
<td>+ 1 -</td>
</tr>
<tr>
<td>Dust protection</td>
<td>+ 8 -</td>
<td>+ 1 -</td>
<td>+ 1 -</td>
</tr>
</tbody>
</table>

Based upon ‘Safety observer’ by Kines et al – coming soon to app stores worldwide (November, 2017)
Smartphones and tablets
IOS and Android
English and Danish
‘Handle the dust’ observer - app

The app is used during safety rounds in order to assess working conditions and behaviour:

- Order and tidiness
- Use of collective dust prevention equipment?
- Use of personal protective equipment and technical aids
- Safe access ways, guardrails, machines, ladders, scaffolding
- Waste management
- Etc.

Document what you see by typing/dictating notes, adding smileys and taking photos

Follow progress over time and benchmark with other areas and sites using the generated safety index

Receive results immediately in the app and in a PDF report sent to your email
Prevention index (conditions and behavior) (example)
The questionnaire

• Developed by in collaboration with National Research Centre for the Working Environment (DK) *)
• Includes:
  • Risk perception in relation to dust exposure
  • Job experience, planning, prevention, skills and knowledge
  • Experience with dust prevention
  • Information, training and instruction
  • Communication
  • Etc.

• Translated to Polish, Rumanian & English
• Completed on site
• Before and (after) the demolition task
• The ”after questionnaire” was discarded

Results from survey 1
Exposure to dust

How often

Are you exposed to dust during a workday?
- Never: 6%
- Rarely: 23%
- Often: 48%
- Always: 23%
- Not relevant: 10%

Do you consider dust to be a risk to your health?
- Never: 17%
- Rarely: 29%
- Often: 48%
- Always: 54%
- Not relevant: 0%

Do you discuss the dust exposure at the different tasks?
- Never: 6%
- Rarely: 23%
- Often: 48%
- Always: 23%
- Not relevant: 0%

N: 48, 6 companies
Results from Survey 2
How often is the work organized to prevent dust exposure?

- Do you find the worksite prepared in a way that you are protected against dust exposure?
  - Never: 2%
  - Rarely: 15%
  - Often: 33%
  - Always: 50%
  - Not relevant: 0%

- Do you have problems at the site (access roads, unsafe waste handling etc.)?
  - Never: 52%
  - Rarely: 35%
  - Often: 6%
  - Always: 6%
  - Not relevant: 0%

- Do you know which tasks creates dust exposure before you start?
  - Never: 96%
  - Rarely: 15%
  - Often: 77%
  - Always: 4%
  - Not relevant: 0%

N: 48, 6 companies
## Results from survey 3

### Obstacles in using technical prevention

#### How often are you instructed in the use of protective and preventive equipment?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>0%</td>
</tr>
<tr>
<td>Rarely</td>
<td>9%</td>
</tr>
<tr>
<td>Often</td>
<td>20%</td>
</tr>
<tr>
<td>Always</td>
<td>63%</td>
</tr>
<tr>
<td>Not relevant</td>
<td>9%</td>
</tr>
</tbody>
</table>

#### What is limiting your access to relevant protection?

<table>
<thead>
<tr>
<th>Limitation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>They are difficult or uncomfortable to use</td>
<td>52%</td>
</tr>
<tr>
<td>Not effective (takes too long)</td>
<td>48%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
</tr>
</tbody>
</table>

N: 48, 6 companies
Results from qualitative analysis of interviews

There are several impediments for preventive practice:

• The relevant technical prevention equipment is not always available - Comfortable and effective dust masks are hard to find

• There is a hierarchy in ‘dust exposure’:
  • Sanitation workers (asbestos, PCB etc.) are fully protected
  • Machine operators are protected by cabin-ventilation
  • Manual site workers are exposed but often outdoors
  • Demolishers are highly exposed at specific operations and task

• Tasks such as handling waste, transporting waste, cleaning in old buildings etc. provides the highest exposure, but are considered less important
Results from qualitative analysis of interviews on four levels

A ”hierachy of motivation”

Companies/managers (2 group int.)
• Include dust-prevention in strategic plans to utilize regulation to transfer costs to the costumer

OHS professionals: (3 group int.)
• The Audit tool is considered relevant and applicable, but the network – collaboration with other OHS – professionals is the added value

Site Manager (7 int.)
• The audit tool is easy to use, (smart phone or tablets), it is an easy way ‘to please’ the Project Manager, but the ability to provide relevant equipment – at the relevant time is restricted

Employees: (8 group int., 6 int.)
• General knowledge that dust is harmful, but little knowledge about health risks, effect of prevention and ‘long-term’ consequences
Conclusive

**Expected outcome:**
Companies and employees experience improved ability to prevent dust exposure – as an integrated part of the daily work

**Companies:**
- Improving image

**OHS professionals:**
- A useful tool to audit prevention
- A tool that is applicable in daily practice

**Site manager:**
- A tool that is applicable in daily practice

**Employees:**
- Focus on prevention and personal protection

**Obstacles**
Companies and employees consider dust exposure as a ‘secondary problem’ and prevention a secondary cost

**Companies:**
- Competition is hard – cost reductions on secondary costs

**OHS professionals:**
- Change jobs
- Relevant tool, improved network - collaboration

**Site manager:**
- Find the App easy to use and mostly relevant

**Employees:**
- Informed but reluctant to use prevention and protection in general

**Gained outcome:**
OHS professionals and some site managers are able to use the audit tool, and are motivated to prevent dust exposure in the sector

**Companies:**
- Include dust-prevention in strategic plans

**OHS professionals:**
- Relevant tool, improved network - collaboration

**Site manager:**
- Too busy – use app only if observed

**Employees:**
- Knowledge to general, Health problems are considered long term
Perspectives

The ‘audit tool’ is effectful if it aligns to a complex world

Good practice – prevention of exposure to dust
Progress so far and onward

• All tests and development cases performed
• One final test pending
• Next step:
  • Final adjustment of APP and development of guide and instructions
  • Catalogue of practical ideas and proposals
  • Continuing support to network of OHS-Professionals
• Further dialogue with the sector and authorities ?
Thank you for your attention

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