Welcome to the
Institute of Local Exhaust Ventilation Engineers
LEV Information Day at
THE
ROYAL SOCIETY
Wally Gilder – Chair ILEVE
Reducing incidents of Respiratory Disease

Stephen McPartland MP
Chair of the APPG on Respiratory Health
ILEVE Now and Beyond

Wally Gilder
Chair ILEVE
Royal Society, London
Governance

- The Institute of Local Exhaust Ventilation Engineers (ILEVE) has been formed under the umbrella of CIBSE (The Chartered Institution of Building Services Engineers). A long established, very successful and respected Engineering Institution with over 20,000 members worldwide.
Introduction

- ILEVE is supported by the Health and Safety Executive. Speaking ahead of the launch of the ILEVE in May 2011, Judith Hackett, Chair of the HSE, said:
  - "The formation of ILEVE is the first step to achieving the goal of improved competence for the LEV industry."
Our Mission

• Our Mission is to provide safely controlled working environments, free from harmful airborne contaminants by:-

  Competence in the practical application of LEV

  Providing our members and the public with first class information and raising awareness of the importance of good air quality and ventilation in the workplace

  Providing a career path for engineers in LEV to full professional registration.
Our Mission cont.

Maintaining and enhancing professional excellence throughout by developing and accrediting courses of study.

Providing a membership designation competency card for Demonstrated knowledge and skills (for Member, Associate and Licentiate grades only).

Setting the criteria for best practice in the profession

Speaking for and representing the profession.
Why?

• The experience of HSE (supported by others) is that many systems seen were inadequate for purpose.
• Because of:
  Inappropriate design.
  Installation/Commissioning deficiencies.
  Process change and use not as intended.
  Inadequate maintenance and damage.
  Unsatisfactory examination and test.
Why?

• Because poorly controlled exposure can cause:
  – asthma,
  – other lung diseases,
  – cancer.

People often don’t know that they are at risk.
Why?

LEV is often poorly
- designed and selected.
- managed and maintained.

Few LEV systems are
‘annually’ examined.

Employers have difficulty
identifying competent and cost-effective suppliers.

LEV, properly applied, managed
and used can control the risks.
How?

Effective LEV installation and commissioning.

Management learning from well-conducted maintenance and thorough examinations.

Employer and supplier joint commitment to better training and information.

Looking for ILEVE Competency.
Competency Card

- Part of membership to ILEVE, individuals receive a Competency card (for Member, Associate and Licentiate grades only).
What does the card say about competency?

That the card holder has been assessed and scored in 1, or all of 5 disciplines. Occupational Hygiene, Design, Installation, Commissioning and Testing.

Assessment for each discipline is based on Experience, Qualification and submitted evidence.

IT IS NOT POSSIBLE TO SATISFY THE REQUIREMENTS OF ANY DISCIPLINE WITHOUT EXPERIENCE AND SUBMITTED EVIDENCE.
What does the competency card tell me?

That the card holder is current. (the card is renewed each year)

That the card holder works to a Professional Code of Conduct.

Is committed to Continuous Professional Development.
Economic costs to Britain (1)

• Estimated total cost associated with workplace injuries and ill health to Great Britain £13.8 billion in 2010/11 (based on 2011 prices).

• Of the total cost in 2010/11, workplace illness cost society an estimated £8.4 billion; workplace injury (including fatalities) an estimated £5.4 billion.
Economic costs to Britain (2)

- Around £5.7 billion of the total cost in 2010/11 represents financial costs; the remaining £8.0 billion represents the monetary value given to individuals’ ‘pain, grief and suffering’.

Total cost of workplace injuries (including fatalities) and ill health in Great Britain, 2006/07–2010/11 (2011 prices)
Occupational Respiratory disease

The latest information shows:-

- **13 000** deaths each year, about two-thirds of which were due to asbestos-related diseases or COPD.
- The next biggest four were lung cancer due to Silica, diesel engine exhaust and mineral oils, and breast cancer due to shift work.
- **35 000** people who worked in the last year, and **130 000** who had ever worked currently have breathing or lung problems they thought were caused or made worse by work.
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Occupational Asthma (1)

- Occupational asthma in Great Britain, 1999-2013.
Occupational Asthma (2)

– In 2012 an estimated 179 new cases of occupational asthma (asthma caused directly by work) seen by chest physicians (SWORD). This is likely to be an underestimate.

– Other data sources suggest the total number of new cases in the wider category of work-related asthma (asthma caused or made worse by work) each year could be more than 10 times higher than this (LFS, THOR-GP).

– During 2010-2012 and the previous two 3-year periods, 'vehicle paint sprayers' and 'bakers and flour confectioners' were the occupations with the highest rates of new cases per year (SWORD).
Causes of Occupational Asthma

<table>
<thead>
<tr>
<th>Occupational asthma</th>
<th>Top Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isocyanates</td>
<td>1</td>
</tr>
<tr>
<td>Flour/grain</td>
<td>2</td>
</tr>
<tr>
<td>Wood dusts</td>
<td>3</td>
</tr>
<tr>
<td>Solder/colophony</td>
<td>4</td>
</tr>
<tr>
<td>Laboratory animals</td>
<td>5</td>
</tr>
<tr>
<td>Cutting oils and coolants</td>
<td>6</td>
</tr>
<tr>
<td>Paints</td>
<td>6</td>
</tr>
<tr>
<td>Acrylics and acrylates</td>
<td>6</td>
</tr>
<tr>
<td>Chrome compounds</td>
<td>6</td>
</tr>
<tr>
<td>Enzymes, amylase</td>
<td>6</td>
</tr>
</tbody>
</table>

The most common causes of occupational asthma continues to be **isocyanates**, and **flour/grain**.
LEV for CONTROL?

- Over £150 million pounds spent annually on LEV.

- Is it value for money?
  - **Yes** - if the correctly designed LEV is used.
  - **No** - if poorly designed LEV is used
Summary Work Stream Plan – May 2014 Onwards

- Formation of Technical working group, started writing guidance
- Completion of the ILEVE diploma/training courses
- Increase ILEVE membership and awareness
- Utilise CIBSE Patron system
- Utilise CIBSE young engineers program
- Formation of CPD criteria for ILEVE
- Regional presentations to IOSH/B&ES/CIBSE/BOHS
- Working with other Safety Groups UK, IOSH, BOHS, B&ES and others
ILEVE NEEDS YOU

Spread the word

Look for competence

www.ileve.org
The Consequences of Getting it Wrong

Dr Christopher Barber
Senior Lecturer in Respiratory Medicine at the University of Sheffield and Deputy Chief Medical Officer at the Health & Safety Laboratory
Occupational lung disease
- the consequences of getting it wrong

CM Barber
Deputy Chief Medical Officer
Centre for Workplace Health
Health and Safety Laboratory
chris.barber@hsl.gsi.gov.uk
Introduction

• What is occupational lung disease?
• What are the common conditions?
• Why is it important?
• What happens to people who get it?
• How can we improve outcomes?
What is occupational lung disease?
Long standing problem

- Anecdotal reports of Roman bakery slaves using cloth as RPE

- Ramazzini 1705.
  
  "For a foul and poisonous dust flies out from these machines, enters the mouth then the throat and lungs, makes the workmen cough incessantly, and by degrees brings on asthmatic troubles"
Lung response to inhaling something at work

Fume

Dust
Lung response to inhaling something at work

Gas/vapour

Mist/aerosol
Wide range of mechanisms

- Direct injury (e.g., acute irritant asthma, pulmonary oedema)
- Infection (e.g., TB, Ebola)
- Allergy (e.g., asthma, EAA)
- Chronic inflammation (e.g., COPD, bronchiolitis)
- Destruction of lung tissue (e.g., emphysema)
- Lung or pleural scarring (e.g., asbestos related disease)
- Cancer (e.g., lung cancer, mesothelioma)
Wide range of effects

- Immediate or after a latent interval of months, years or decades
- Variable depending on individual susceptibility (genetic)
- May occur whilst still at work or after retirement
  - E.g. silicosis and asbestosis may progress despite not being exposed, due to lung retention of dust/fibres
- Effects range from mild to very severe (death)
- May be reversible or irreversible
What are the common conditions?
SWORD data 2013

- Asthma: 0.5
- Inhalation accidents: 3
- EAA: 1
- Bronchitis/emphysema: 1
- Infectious disease: 5
- Non-malignant pleural disease: 13
- Mesothelioma: 5
- Lung cancer: 32
- Pneumoconiosis: 9
- Other: 34

Centre for Workplace Health
SWORD data 2013

- Asthma
- Inhalation accidents
- EAA
- Bronchitis/emphysema
- Infectious disease
- Non-malignant pleural disease
- Mesothelioma
- Lung cancer
- Pneumoconiosis
- Other
Occupational asthma - definition

• 90% - asthma induced by sensitisation (allergy) to an agent inhaled at work

OR

• 10% - asthma induced by massive accidental irritant exposure at work (direct airway injury)
Allergic occupational asthma
Why is it important?
Occupational asthma - estimates

- 9-15% of all adult onset asthma
- HSE estimate 1500-3000 new cases per year
- 7000 per year if include work-aggravated asthma
- 0.2-0.5% of all young adults have asthma that is due to or significantly aggravated by work
- UK costs of > £1 billion over last decade
What happens to people who get it?
Accelerated loss of lung function

- Slope of regression line is FEV₁ decline.
- FEV₁ at time of removal extrapolated from pre-removal regression line.
- Post-removal regression line using data points six or more months post-removal.
- FEV₁ one year post-removal, estimated from post-removal regression line.
- One year step-up period.

Are we failing workers with symptoms suggestive of occupational asthma?

What happens to people who get it?
- Remission if found early and cease exposure
- Chronic breathing problems
- Lifetime of medication
- Impaired quality of life
- Unemployment/reduced income
- Benefits
- Depression
How can we improve outcomes?
Reduction in exposures reduces airway inflammation

Intervention n=32

Control n=10

Asthma

Standards of care for occupational asthma


see editorial on p 190

Additional data are given in the three Appendices published online only at http://thorax.bmj.com/content/doi/10.1136/thoraxjnl-2009-200626.

1 Centre for Workplace Health, Sheffield, UK; 2 Centre for Workplace Health, Buxton, UK; 3 University of Aberdeen, Aberdeen, UK; 4 Heartlands Hospital, Birmingham, UK; 5 Queen’s Medical Centre, Nottingham, UK; 6 Royal Brompton Hospital, London, UK; 7 G P Research Unit, North-West Lung Centre, Manchester, UK; 8 Royal Victoria Infirmary, Newcastle upon Tyne, UK; 9 North Manchester General Hospital, Manchester, UK; 10 BOHRF, SCIM and FOM, London, UK; 11 North West Lung Centre, Manchester, UK; 12 Health & Safety Executive, London, UK; 13 Asthma Chest Centre, University Hospital Aintree, Liverpool, UK

Occupational asthma remains a common disease in the UK with up to 3000 new cases diagnosed each year. The Health and Safety Executive (HSE) estimates the cost to our society to be over £1.1 billion for each 10-year period. In October 2001 the Health and Safety Commission agreed a package of measures aimed at reducing the incidence of asthma caused by exposure to substances in the workplace by 30% by 2010. Key to this aim is primary prevention by proper risk assessment and exposure control, together with secondary prevention to ensure reduction in the delay between the development of allergic symptoms at work (normally nasal or respiratory) and appropriate advice to the affected worker and workplace.

Conservative estimates suggest that one in 10 cases of adult onset asthma relate directly to sensitisation in the workplace, with a smaller subset of workers with acute irritant induced asthma. The latter—formerly termed reactive airway dysfunction syndrome (RADS)—relates to asthma caused by exposure to high levels of from the way it appears in guidelines, this article serves primarily to inform readers of the recent evidence base and translate this into clinical practice.

This article is aimed to be of value to physicians and nurses based in primary and secondary care and occupational health and public health departments. It will also hopefully be useful to employers and interested workers (such as health and safety representatives).

The evidence base quoted is consistent with and normally sourced from the BOHRF guidance, although references that have been published since this guidance are cited in addition. The final version of this document has been agreed by the Standards of Care Committee and collectively produced by the Group of Occupational Respiratory Disease Specialists (GORDS), a secondary care-based group of respiratory physicians with a clinical and research interest in occupational lung disease. This group meets regularly and is coordinated by HSE.

The evidence-based ratings cited through this document relate to the original grading of evidence strength assigned by BOHRF during their evidence-
Occupational asthma: evidence based diagnosis and management

Interactive e-learning online module
Author: Chris Barber and Timothy Frank

Target audience:
Foundation programme
International
Practice nurse CPD
Hospital doctor CPD
GP CPD
GP trainee
Practice manager CPD
Summary

• OLD is avoidable

• Chronic illness and premature death

• Unemployment and loss of income

• Controlling exposure prevents disease
HSE’s Overview of Wood Dust Control in the Woodworking Industry

John McAlindden
HSE Topic Lead LEV
HSE’s overview of wood dust control in the woodworking industry

john.mcalinden@hse.gsi.gov.uk
What will be covered:

- Why controlling wood dust needs to be improved

- Overview of 2014 project to update HSE’s profile of wood dust control in the UK
Woodworking Safety - but what about health?
Woodworking Safety - but what about health?
1st Initiative - More HSE wood dust guidance

Wood dust - Controlling the risks

HSE information sheet

Introduction

This information sheet is one of a series produced by HSE’s manufacturing sector on wood dust. It provides advice for woodworking employers. It explains what the health and safety risks from wood dust are and how they can be controlled. It will also help employers to ask the right questions when dealing with local exhaust ventilation (LEV) designers and suppliers.

Types of wood dust

In addition to the tiny particles of wood produced during processing, wood dust can also contain bacteria and fungal and moss spores. The quantity and type of wood dust will depend on the wood being cut and the machine you are using, for example:

- whether the timber is green or seasoned;
- whether it is a hardwood, softwood or composite board;
- how aggressive the machine cutter or blade profile is.

The biggest risk is from fine dust, as you can breathe this deep into your lungs where it will do the most damage. Fine dust will also spread further from the cutting process so it is important to clean ledges and other workroom surfaces regularly to prevent dust accumulating.

Why is it necessary to control wood dust?

Health risks

Wood dust is a substance hazardous to health because it can cause serious non-reversible health problems, including:

- skin disorders;
- obstruction in the nose, and rhinitis;
- asthma;
- a rare type of nasal cancer.

Safety risks

Wood dust is flammable and, in certain situations, can cause a fire or explosion. Every year, premises are severely damaged or destroyed by wood dust fires that usually start in dust extraction equipment. Wood dust explosions in buildings are rare, except in the chipboard industry.

It also makes sense to control wood dust from a business point of view as you will need less time for cleaning up, and there will be fewer slips and trips hazards caused by settled dust.

What causes high wood dust exposures?

The following activities are likely to produce high dust exposures, some over long periods:

- machining operations, particularly sawing, routing and fuming;
- sanding, by machine and by hand;
- using compressed air to blow dust off furniture and other articles, to be avoided before spraying;
- hand assembly of machined or sanded components;
- operations involving processing composite boards, eg medium density fibreboard (MDF);
- the bagging of dust from dust extraction systems;
- housekeeping, especially if sweeping up and using compressed air (again to be avoided).

What the law says

Because of the potential health problems, wood dust is covered by the Control of Substances Hazardous to Health Regulations (COSHH). These set out the legal requirements to protect workers from health risks arising from hazardous substances at work. Under COSHH, employers (including contractors) have a duty to carry out a suitable and sufficient risk assessment and take steps to ensure they prevent or adequately control exposure.

COSHH states that, where it is not reasonably practicable to prevent exposure to a hazardous substance, then the employer has to provide a suitable method of personal protection to avoid the risk of exposure.
2nd Initiative - HSE wood inspection programme

- Machinery safety
- Controlling risks from wood dust
- Training in use of machinery and LEV
- Suppliers/examiners are providing suitable/adequate information to the dutyholder
HSE wood inspection programme 2013-14 results

- 1,004 visits to HRS premises
- 562 Notices issued
- 241 Notice for COSHH issues
- 65% of COSHH Notices for either no LEV 14 month test report or a COSHH assessment
Why do we need this project?

- HSE target key health issues – evidence of poor control from visits
- Both hardwood and softwood dusts are respiratory sensitisers
- Hardwood dust is a carcinogen
- Two major projects in 1990 and 2000 but still a poor understanding by industry of compliance and control measures required
What the project will do

• Generate up to date intelligence
• Establish industry profile
• Fill in knowledge gaps
• Find out what the problems are and solutions needed
How this has worked so far – Phase M1 of the project

- Presented proposal to BWF/Didac Ltd at Wood Safety Group meeting research visits.
- BWF/Didac Ltd identified three suitable sites
- Information provided to companies and HSE site visit with Didac Ltd
- Discussion of common failings such as no RPE fit tests or health surveillance
- All three companies agreed to participate
Occupational hygiene visits:

- Measurement of wood dust exposure
- Assessment of exposure control hardware and working practices
- Feedback as per HSE protocol

Other aspects to be undertaken later:

- Health assessment – including questionnaire, lung function and blood tests for asthma type symptoms with feedback to workers only (medical ethics)

- Human Factors – to gain an understanding of the barriers to achieving adequate exposure control
All sites good performers using mixed wood types. Evidence however of exposures at each site at or in excess of the WEL (5 mg/m$^3$):

Site 1 – exposures (n=4) ranged from 1.3 to 5 mg/m$^3$

Site 2 – exposures (n=5) ranged from 1.3 to 7.4 mg/m$^3$

Site 3 – exposures (n=13) ranged from 0.2 to 5.6 mg/m$^3$
Phase M1 hygiene visits - general

Control generally OK but room to improve:

- Main LEV system tested as per COSHH requirements but some standalone systems were missed out
- LEV not always installed where needed (e.g. hand routing)
- RPE issues – P3 provided BUT no fit tests (now actioned), inconsistent use, stubble
- Cleaning generally by vacuum, but not always H or M class
Phase M2 of the project

Additional site visits now taking place. These include:

- Sites which were involved in the Y2000 survey
- Boat builders
Thank you for listening.
Any questions?

john.mcalinden@hse.gsi.gov.uk
Occupational Health Risk Management and Benefits Realisation: - Practical Approaches

John Cairns
Chair – Safety Groups UK
Occupational Health Risk Management and benefit realisation:- Practical Approaches

John Cairns
Chairman
The H&S burden in Britain today

- 140 + notifiable fatals (excluding 800 on the road)
- 13,000 health related deaths
- 1.1 million injuries
- 2.2 million cases of work related ill health
- 4000 Occupational COPD deaths per annum
So where do Safety Groups fit in?

- 70 plus Groups in UK – National Coverage
  Providing low cost, local, entry level advice and briefing

- Partnership working with HSE, ILEVE, RoSPA, IOSH, BSC, IIRSM, NEBOSH etc.

- Raising awareness/spreading good practice

- Facilitating events & cascading information to SME’s

- Providing a friendly informal point of contact for SME’s & others via the UK network of safety groups and the opportunity to attend local safety group meetings.
SGUK Supports the ILEVE Competency Card for LEV Engineers
Partnership working
Construction Dust Partnership
The LOcHER Project
IIRSM & SGUK

LOcHER
Learning Occupational Health by Experiencing Risks
Health Risks at work – Do you know yours?
HRAW – What’s it about?

- This initiative provides information and assistance in identifying the major causes of occupational ill health, raising awareness of these illnesses and provides practical solutions & sources of support.

- This initiative has the full support of the major health & safety professional bodies and other participating organisations.
www.healthrisksatwork.com
www.healthrisksatwork.com
Introducing Health Risks at Work

- Multi-language DVD to raise awareness of Occupational Health Issues.
- Risks to Skin
- Risks to Breathing
- Risks to Hearing & Touch
- Risks to Muscles, Bones & Joints
- Risks to Wellbeing
• Thank you for your attention.

• Questions
Better use of LEV to Reduce Worker Exposure to Wood Dust

Jon Gibson
Chair ILEVE
Royal Society, London
Better use of LEV to reduce worker exposure to wood dust
Introduction

DIDAC

• Specialist provider to the wood industry for training and consultancy

• Work with industry and stakeholders, including the HSE on a number of issues

• Currently working with HSE/HSL on Dust/LEV Project
Common exposure control failings in woodworking

No LEV at all!
Common exposure control failings in woodworking

LEV not always provided where most needed
Common exposure control failings in woodworking

Poor control of storage / removal
Common exposure control failings in woodworking

Annual LEV TExT (thorough examination and testing) not always provided

Evidence of no (or inadequate) maintenance on system and at machines
Common exposure control failings in woodworking

Dry sweeping up activities still taking place
Common exposure control failings in woodworking

- Poor selection of RPE is a common occurrence
- Fit testing not undertaken in most cases
- Wood dust the 6th most common cause of occupational asthma
- Lack of health surveillance
DIDAC are an industry body that work with HSE on ill health issues as well as safety. We are partnering HSE to:

• generate up to date intelligence on occupational exposures to wood dust by assisting with current wood dust project.

• review the volume flow rates required by woodworking machine LEV systems for adequate control of wood dust.

• establish profiles for the key business areas excluded from previous surveys and re-map the woodworking industry.

• establish and agree a baseline occupational exposure dataset characterising good controls practice – we will find the problems and derive solutions.
Dominic Pocock - Health & Safety Laboratory

Overview of what’s involved in the project
Case studies: Introduction

Aims of the work

• To measure the volume flow rate of the LEV applied to a selection of woodworking machines and compare to recommended values\(^1\) noting variations from recommended designs

• Measure the personal and area exposure to operators with LEV operating at known volume flow rates

• Optimise the volume flow rates to achieve or maintain good control

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Case studies: Methods

Approach

• Volume flow rates calculated from measured velocity traverses in ducts
• Control was assessed and qualitatively optimised visually using Tyndall illumination
• Personal exposure measured by sampling inhalable wood dust in the breathing zone of operator(s)
Case studies: Machines covered

Band resaw

Narrow band saw

Cross-cut saw
### Case studies: Selected results

#### Selected results from sampling campaign

<table>
<thead>
<tr>
<th>Machine</th>
<th>Measured VFR (m³/s⁻¹)</th>
<th>%age of Rec. VFR (%)</th>
<th>Approximate personal exposure</th>
<th>Approximate area exposure¹</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small bandsaw</td>
<td>Top: 0</td>
<td>0</td>
<td>0.3 x WEL</td>
<td>0.2 x WEL</td>
<td>Only bottom hood fitted to this machine</td>
</tr>
<tr>
<td></td>
<td>Bottom: 0.2</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Band resaw</td>
<td>Top: 0</td>
<td>0</td>
<td>2 x WEL</td>
<td>0.5 x WEL</td>
<td>Only bottom hood fitted. If no top hood, flow rate of bottom hood needs to be increased.</td>
</tr>
<tr>
<td></td>
<td>Bottom: 0.25</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Top: 0</td>
<td>0</td>
<td>0.75 x WEL</td>
<td>0.5 x WEL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottom: 0.46 (Max)</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross-cut saw</td>
<td>Top: 0</td>
<td>0</td>
<td>0.5 x WEL</td>
<td>0.4 x WEL</td>
<td>Tested with improved extended enclosure</td>
</tr>
<tr>
<td></td>
<td>Bottom: 0.295 (Max)</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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1. Presented as a proportion of the Workplace Exposure Limit of 5 mgm⁻³ from EH40/2005 Revised 2011

© Didac
Case studies: Band saws

Both band saws lacked the top hood from the recommended design

Case studies: Narrow band saw

• Tested as found volume flow rate was 120% of recommended rate for bottom hood
• Personal exposure was determined to be approximately 0.3 time exposure limit
• Volume flow rate was optimised using visual assessment downward to 110% of recommended rate with no significant decrease in exposure
Case studies: Band resaw

• Volume flow rate to the bottom hood was set at the recommended value
• Resulted in personal exposure of twice the exposure limit
• Volume flow rate to bottom hood increased to maximum value
• Reduced personal exposure to 0.75 times exposure limit
Case studies: Cross-cut saw

- The top hood or blade guard was not extracted as recommended.

Initial assessment indicated poor control.

- Bottom/rear hood was extended to increase the degree of enclosure.


© Didac
Case studies: Cross-cut saw II

- Tested as found the volume flow rate to the bottom hood was 150% of the recommended value
- Resulted in personal exposure of slightly less than half of the exposure limit
- Testing shows that it is possible to reduce exposure to less than the limit for these three machines but following the recommended design it should be possible to further reduce exposure or achieve the same results at a lower volume flow rate
Problems Didac identified with LEV supply chain

Open sock filters, next to machines, operators.

Dust, Flame (as result of explosion/catching fire)
Problems Didac identified with LEV supply chain

• Not providing suitable training or instruction

• Not making reports clear, especially to performance
Lets be reasonably practicable

• Systems should be fit for purpose – does not mean they must be perfect as it may not always be practicable to achieve higher volume flow rates to improve wood dust capture

• RPE will be required as well as LEV in some cases
END OF PRESENTATION

Questions
Why LEV Sucks

John Saunders
Principal Scientist – Health and Safety Laboratories, Buxton.
Why LEV sucks

23rd September 2014

John Saunders
John Saunders

- Scientist with HSL for over 25 years working in industrial and containment ventilation
- Worked closely with HSE on the HSE ‘LEV Project’
- Supports HSE with the development of guidance
- Supports HSE incident investigations
- Represents HSE on a number of CEN standard committees including spray booths, fume cupboards and welding controls
- Carry out research on ventilation controls for HSE and commercial companies
Content

- Why LEV often fails to protect
- LEV supply story – good practice
- LEV supply story – common practice
- Case study
- Commissioning LEV
- Checking control effectiveness
- Possible ways ILEVE could help
Matching LEV to potential degree of over-exposure

This gap in control effectiveness leads to respiratory and other diseases.
Possible reasons why LEV often fails to offer adequate respiratory protection:

- Employers often don’t appreciate the extent of exposure risk.
- Inadequate checking and maintenance.
- Employers / employees over-optimistic about LEV capabilities.
- Poor design.
- Poor / lack of commissioning.
- Purchasing: Lack of a LEV specification.
Control of ‘safety’ and ‘health’ hazards

Poor guarding

Better guarding.
And LEV dust control?
LEV supply story – Good practice

Employer recognises there’s an inhalation problem

Hierarchy of control
- Eliminate
- Substitute
- Emit less
- Contain
  - Engineering controls
  - Procedural controls
  - PPE

Consider process change

LEV Specification

Installed and commissioned against the spec and shown to control

Checked and maintained

Annual thorough examination and test (TExT)
Good practice – Realities

- Depending on company resources and the complexity of the LEV system, outside assistance may be required – possibly at each and every stage

- LEV modifications
Is this what many customers think of as LEV?
**LEV supply story – Common practice**

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**Does it do what it’s meant to do? Don’t know! But it’s been tested**

1. Employer told he/she has a ‘problem’ & needs LEV
2. No LEV ‘Spec’ of any sort produced
3. Off the shelf solution from a catalogue
4. Installed but not commissioned
5. Some/no maintenance
6. Annual thorough examination and test fails to pick up poor control

- Often the LEV hood is not matched to the process and source(s) causing exposure - it’s the wrong type!
- Rarely done thoroughly. Control effectiveness is usually missed out
- Some suppliers provide little guidance and employers don’t do it frequently or systematically enough
- Is often not done and when it is it is often incomplete and uncritical

Does it do what it’s meant to do? Don’t know! But it’s been tested.
‘Control culture’ within different industries –
Large companies

- Range of professionals (within the company)
- They understand the chemical risk
  - Some companies (e.g. pharmaceutical) have detailed knowledge of the effect of chemicals on the body
- Often collaborate with other large companies in the same industry and discuss safety issues
‘Control culture’ within different industries – SME’s (1 of 2)

- Little knowledge of health risk – difficulties appreciating the risk
- Small scale operations, often manually intensive and working in close proximity to the contaminant source
- Often controls in large industries are different and are not easily applied to small companies
- Rely on others (e.g. H&S regulator) to identify the allergenic risk and provide a solution
‘Control culture’ within different industries – SME’s (2 of 2)

- Trade associations – main route to help develop exposure controls
  - But few SMEs are members or;
  - Often no effective trade body

- This results in companies working in isolation

- Therefore often rely on ‘off-the shelf’ control solutions
  - New LEV control measures difficult to develop for individual companies

- Result: poor and erratic exposure control
The ‘cost’ of poor LEV control

- Two masons have silicosis:
  - Stone mason 1 (age 33) – has severe silicosis
  - Stone mason 2 (age 63) – less severe silicosis

- Company fined £30,000 in Crown Court, plus £6,000 costs

- Both men making civil claims
Stone mason company – What went wrong?

- The company had LEV installed
- They paid for TExT every year and kept the records
- But ..... 
- Each and every TExT failed to spot the lack of control
  - 14 years
Stone mason company – What went wrong?

Employer recognises there’s an inhalation problem.

Hierarchy of control.

LEV Specification.

Installed and commissioned against the spec and shown to control.

Checked and maintained.

Annual thorough examination and test (TExT).
Employer’s role

- Describe the production process
  - Production sequence, amount of material used and product produced

- Describe sources of airborne contaminant
  - What dust or fume can be generated?
  - Work activities and processes generate dust or fume

- Numbers of people thought to be exposed

- Are there any current LEV controls?
Employer’s role

- Identify all processes and sources to be controlled
  - The employer may need help with this
- Work with supplier to minimise sources and arrange for best LEV application
- Be clear of the requirements of the work process and the operator(s)
- Are some/all standard processes with standard & effective LEV designs?
- What benchmark(s) of control success are acceptable?
HSE LEV guidance – HSG 258

Four stages

1. Installation and verify that the system was installed as designed

2. Show LEV systems meets specified technical performance

3. Control effectiveness

4. Commissioning report
Control effectiveness

Qualitative includes:

- Making particle clouds visible (Tyndall effect)
- Making air movement visible with smoke
- Insightful observations

Quantitative includes:

- Quantitative performance measurements (pressures, velocities, etc) and comparison with requirements
- Air sampling of exposure and work room levels
- Containment testing
Checking quantitatively control effectiveness

- For fixed designs and a well described process
  - Standard LEV known to be effective

- A standard method (with a well defined surrogate source)
  - LEV design may vary but has to meet the prescribed pass/fail or efficacy results reported
Pottery industry – a well defined process with a well researched control solution

Fixed design

Fig. 5 Arrangement of towing hood for flat ware.
Manufacturer’s extraction solution

Machine extraction redesigned in order to achieve satisfactory control of dust
Checking control performance

- For fixed designs and a well described process
  - Standard LEV known to be effective

- A standard method (with a well defined surrogate source)
  - LEV design may vary but has to meet the prescribed pass/fail or efficacy results reported
Fume cupboards – well described test method

- A suite of test methods described in BS EN 14175
- Surrogate source (SF$_6$) to represents typical activities carried out in fume cupboards
- Currently no pass/fail criteria – depends upon the specification requirements
  - But suggestions being developed
What can ILEVE do?

- Specification
  - ILEVE guidance?

- Commissioning
  - Promote the role and need for commissioning?
  - Develop industry standard tests?
Thank-you for listening
Any questions?
LEV Engineering in Healthcare

Dr Hywel Davies
Technical Director - CIBSE