ILEVE - Institute of LEV Engineers
CPD & Information Day

Thorough Examination & Test of LEV—Local Exhaust Ventilation Systems

Jane Bastow CMIOSH
Chartered Safety and Health Practitioner
OSCHR Registered LEV Consultant
Managing Director P&J Dust Extraction Ltd
Frequent Problems With TExT Reports

Local Exhaust Ventilation (LEV) is a serious business, protecting people at work, from airborne hazardous substances, in the form of dusts and fumes, which can cause Respiratory Disease, Industrial Asthma, Cancer & COPD (Chronic Obstructive Pulmonary Disease).

Users of LEV & their employers are given false re-assurance by poor TExT reports.

Often LEV Thorough Examination and Test reports

- do not represent a THOROUGH EXAMINATION of the LEV
- ignore obvious problems
- state ‘not ascertained’ to crucial questions
- omit the minimum data required by Regn 9 of CoSHH
- fail to include the best practice content identified in HSG258
LEV— The Statutory Obligations

CoSHH - Regulation 9

Maintenance, examination and testing of control measures

Every employer who provides any control measure to meet the requirements of regulation 7 shall ensure that in the case of plant and equipment, including engineering controls it is maintained in an efficient state, in efficient working order, in good repair and in a clean condition.
Maintained in

- Efficient state (effective control)
- Efficient working order
- Good repair
- Clean condition
Objective

The objective of Regn 9 of CoSHH is to ensure that every element of a control measure performs as originally intended, and continues to adequately control the exposure of employees to substances hazardous to health.

This includes the identification of any significant deterioration in any element of the control measure, and the taking of any necessary corrective steps.
The TExT is NOT a list of transport velocities

A competent TExT engineer doesn’t not measure transport velocity at 19 m/sec and say FAILED this should be 20m/sec

TExT requires professional judgement and a range of qualitative and quantitative tests to judge effectiveness
LEV TExT report contents:

Plant Operator & Site Details

- Name & address of the employer responsible
- Site name & address
- Site Contact who discussed the report findings with the LEV tester during the visit.

The tester should discuss the LEV with the user and review the Log book to ascertain if:

- any problems or issues have been experienced
- there have been any relevant changes
Changes in the workplace that will affect the LEV and usually require Re-Commissioning:

- Changes to plant and machinery
- Different process
- New materials
- New work practices
- Building modifications e.g. add/remove ventilation
- Changes to duration or intensity of use beyond the scope of the original specification
LEV Plant Identification & Description

- Identification of the LEV plant, make model, serial no, Employer asset register no,
- Location of the LEV
- LEV Specification
- Is the LEV appropriately situated
- Is the LEV correctly bolted down/fixed

Test Conditions
The conditions at the time of test and whether this was normal production or special conditions.
LEV System Drawing

- Layout of the LEV system, giving the key components.
- Sources of the hazardous substance
- Position of all Test Points
- Commissioning drawings checked for accuracy and subsequent system changes
Process & Hazard Information

- Details of the Process
- Source of the hazardous substance
- Name of the hazardous substance(s) the LEV is controlling
- The appropriate exposure limit(s) (WEL or OEL) for the hazardous substances controlled
- Control parameters set out in the LEV system specification & commissioning report
LEV Intended Operating Performance

- Is the intended operating performance achieved?
- Is the system performing as intended?
- Is the system being used as intended?
Restrictions on the System Operation

Is the LEV system designed to serve all of the sources simultaneously, or only some of them?

Is the operator aware of the concurrency limits?

Maximum number of hoods/enclosures and which combinations to Can be in use at any one time should be stated in the report.

When <100% a system plan should be displayed.
Information about Each Hood or Extraction Point

- Location or position of enclosures/hoods
- Physical condition of hood structure
- Conductive or Non Conductive material
- Static pressure behind each hood or extraction point
- Face velocity
- Comments on the operator use of the hood
- Effectiveness of the hood at controlling the hazardous substance – smoke tests / dust lamp / dust monitor
- Is there a Pressure Gauge (Air Flow Indicator), if so is it in good condition & accurate
For larger hoods (200 mm +)

- Face velocity variation across the hood
- Is the variation acceptable? max ± 20%
- Maximum face velocity
- Minimum face velocity
- Average face velocity
- Acceptability of the velocities
Classification of Hood with Usage Advice

Description of each hood as one of the following:

- Capturing,
- Enclosing,
- Receiving,
- Mixed Mode

The appropriateness of the hood class for the process, application and hazard being controlled.
Advice on the best way to improve the effectiveness of that class of hood.
Extra details for Capture hoods & mixed mode Capture /Receiving hoods:

- Effective capture zone of hood
- Does the effective zone encompass the source work area
- For larger hoods Light Level, in Lux with comment on appropriateness of the light level for the tasks.
Extra details for Spray booths, Rooms, and Work Enclosures

- Air Clearance Time Testing
- Presence of turn tables / jigs and how this affects the effectiveness
- Light Level, in Lux
- Comment on appropriateness of the light level for the specific tasks.
Extra details for Fume Cupboards

- Sash position & condition
- Height of the working aperture,
- Is there a maximum stop?
- Does min stop ensure a gap of at least 50 mm
- Change in average face velocity when working aperture changed from 400 to 200 mm
- Is the work surface dished / lipped / is it in good condition?
- Comment on condition of any Asbestos components
- Is glazing safety glass?
- Is saturation testing needed?
- Air Clearance Time
- Light Level $\geq 300$ Lux
Ductwork

- Duct design comments, appropriateness of bends, branches
- Duct condition
- Duct material conductive or not & earth status
- Shape & dimensions
- Ducting transport velocity achieved, is it appropriate
- Ducting volume flow
Filter

- Specification, filter media, type, quantity,
- Filter condition & effectiveness
- Filter/Collector – Volume flow
- Static pressure at inlet and outlet
- Static pressure drop across filter
- Differential filter pressure gauge, type, verify accuracy
- Does the system return the filtered air to the workplace? If so: Filter efficiency AND Concentration of contaminant in returned air
Filter Cleaner

- **Specification**, type, quantity, automatic or manual
- **Automatic types**: start/stop/duration timings
- **Filter cleaning efficiency**
- **Condition**
- **Comment on the filter cleaning effectiveness**
- **All other parameters noted on the Commissioning report**
Fan & Motor Details

- Specification, fan type
- Volume flow
- Static pressure at inlet
- Rpm per motor plate and actual
- Rpm Impellor per fan plate and actual
- Amps absorbed
- Direction of rotation, and is this correct
- Also for transfer/booster fans/motors
Flexible Hose

- **Hose condition**
- Does the substance require a conductive helix?
- **Earth status**
- Appropriateness for the substance / process
- Is length of hose excessive? Should not be more than 0.5 metre, unless essential to facilitate the production process.
Air Flow Balance Dampers

- **Balance Damper Condition**

- Are there Airflow Balance Dampers designed to be fixed in correct position?

- Did you adjust and fix the airflow dampers.
Blast Gates / Flow Valves

- Are blast gates fitted enabling the operator to open and close extraction inlets?
- How many open inlets was the LEV designed to extract from simultaneously?
- How many open inlets were in use?
- How many open inlets did user say are usually used?
- If the system is designed for less than 100% simultaneous use, is there a plan displayed showing which inlet combinations can be open at any one time.
- Blast gate condition
Explosion Venting Device

- Type of venting
- Is it in good condition
- Does it vent to a safe area
- Evidence of ATEX rating
Discharge

- Discharge type
- Is it in good condition
- Is discharge of an appropriate design
- Is discharge to an appropriate location
Sound levels

The commissioning report should provide noise level readings for the LEV and at each workstation.

Ideally at TExT the current sound levels should be compared with these benchmarks to identify increased noise levels, which may be caused by component deterioration or damage.
Minor Repairs To Improve Performance

If there are minor repairs or adjustments that would improve the system performance the TExT engineer should carry these out prior to or during the test.

Details of any work done should be recorded on the report.
Maintenance Audit

- Is the LEV in a good state of repair, and in a clean condition? All parts of the LEV should be THOROUGHLY INSPECTED
- Is there a Maintenance Log
- Has the Maintenance Log been completed appropriately, commensurate with the use of the LEV system
Report Conclusions

The LEV:

Is / is not in an **Efficient state**, (effectively controlling the hazardous substance)

Is / is not in **Efficient working order**, 

Is / is not in **Good repair**

Is / is not in **Clean condition**
Prioritised Action Plan

Identify the repairs and improvements needed to restore the LEV to an efficient state in efficient working order in good repair and in a clean condition

A timescale stating by when these should be completed

It is possible for LEV to be effective in controlling the hazardous substance whilst being in a poor state of repair and not in a clean condition
Photographs

- Showing the system components, sources and hoods.

- Illustrating details of any improvements required or problems referred to in the report.
Ideally, reports should classify improvements into three categories:

**Essential** - LEV is not effective, these improvements should be carried out as soon as possible.

**Recommended** - LEV is effective but does not comply with best practice, complete when funds allow.

**Comments** - Suggestions and advice to further improve system performance.
Items likely to fail before next test

The TExT report should identify components which, whilst satisfactory at the time of Thorough Examination and Test are likely to require replacement before the next inspection.
Methods Used To Judge Effectiveness of the LEV

- Details of the qualitative and the quantitative methods used.
- List of instruments used, with their serial numbers.
- Last calibration date for instruments used
Report Details

- Date of this thorough examination and test
- Date of the last thorough examination and test
- Signature, Name, Job Title & Employer of person carrying out the examination and test
- Date Next Inspection due (max 14 months, usually annual) Unless process is listed in CoSHH Schedule 4 as <14 OR a more frequent interval has been specified in the LEV system O&M manual or the Commissioning LEV report.
Re-test Following Repairs

Usually a re-test is required following repairs or improvements specified in the Action Plan.

This is to prove the effectiveness of any repairs, and ensure that the statement of control now confirms adequate control of the hazardous substance.

The requirement for a re-test should be made clear on the report.
Thank You

Any Questions?