LEV Standards Coalition

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Fretsaws

Sources of dust generation and LEV

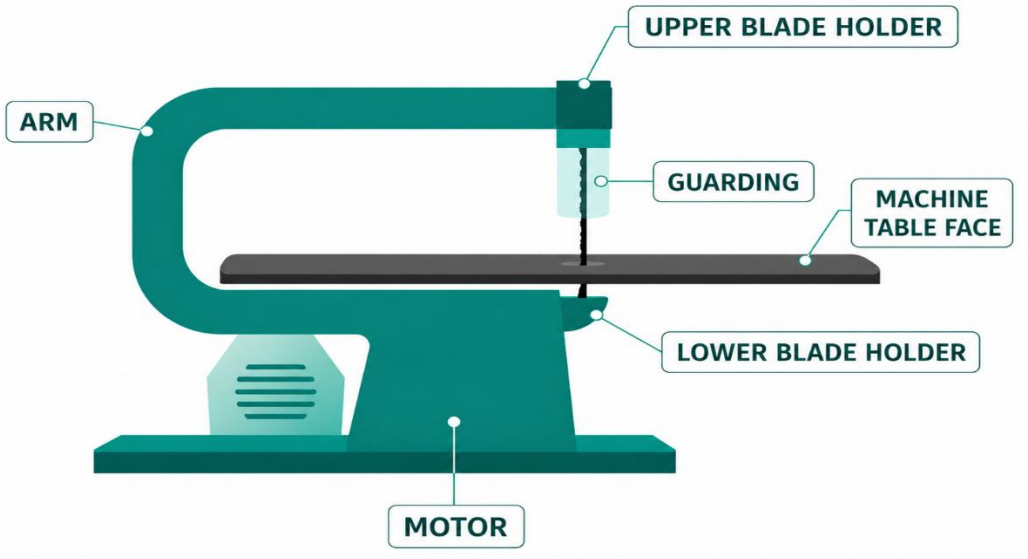
Purpose of this factsheet

This factsheet provides practical guidance for LEV practitioners assessing dust control on fretsaws. It highlights the main areas where dust is generated, the control measures that are likely to provide effective capture, and the key checks that can be used to assess whether the controls are working as intended.

What is a Fretsaw

A fretsaw is a precision cutting tool fitted with a fine, narrow blade. It is commonly used to make intricate internal and external cuts in relatively thin materials.

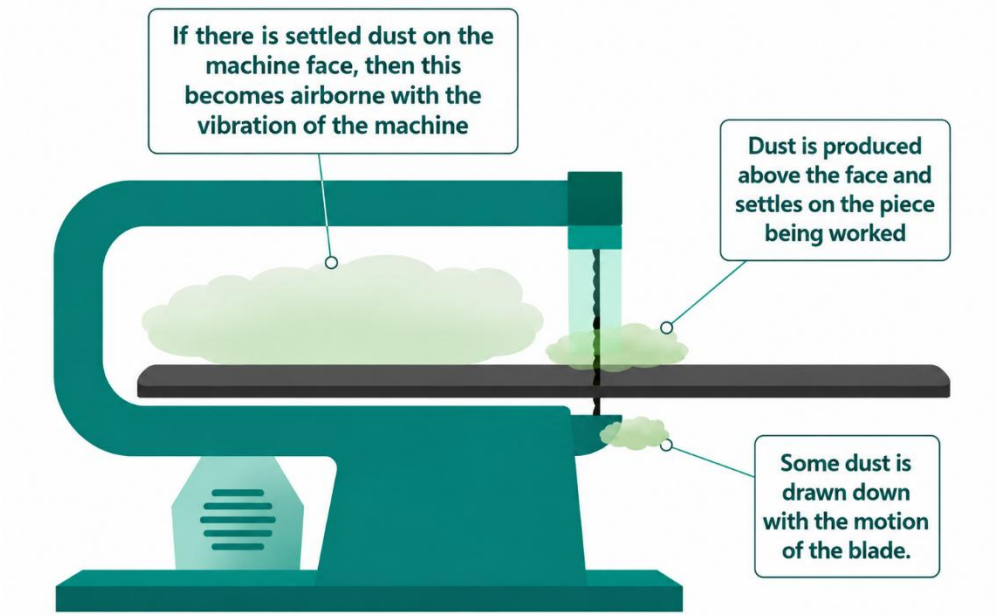
When cutting dust-producing materials, dust can be generated both above and below the machine table. Effective control therefore depends on identifying the sources of dust release and positioning extraction as close to those sources as practicable.



Where is dust generated?

The main sources of dust are:

- **At the point of cut**, where the blade passes through the material.
- **Below the machine table**, as dust is carried through the blade slot.
- **On the machine table and workpiece**, where settled dust can be re-entrained into the air by vibration from the saw.



What extraction is required?

Fretsaws do not always have effective built-in extraction and may therefore require additional capture hoods.

Where practicable, effective control should include:

- **Lower extraction** positioned beneath the cutting table and arranged to draw air and dust through the blade slot. The design should provide good enclosure while maintaining suitable access for blade changes.
- **Upper capture extraction** positioned as close as practicable to the blade and point of cut to capture dust released above the workpiece.

The position and design of both extraction points are important. An extraction connection that is too far from the source, or poorly enclosed, may provide airflow without achieving effective dust capture.

Additional control measures

On some fretsaws, the machine design may prevent an upper capture hood from being positioned sufficiently close to the point of cut. Where effective capture cannot be achieved by LEV alone, additional measures should be considered to reduce exposure As Low As Reasonably Practicable (ALARP).

These may include:

- Suitable RPE used in conjunction with the LEV.
- Vacuum cleaning dust that accumulates on the workpiece.
- Regular vacuum cleaning of the machine table and surrounding area.
- Avoiding the build-up of settled dust that could be disturbed by machine vibration.

How do we assess if control is effective?

Assessment should include both **quantitative measurements** and **qualitative observations**. Measurements alone should not be relied upon; the practitioner should also establish whether dust is being effectively captured during normal operation.

Quantitative checks

- **Duct velocity**
  For solid ductwork, record static pressure and duct velocity. For fine wood dust, a minimum conveying velocity of **15 m/s** should be used as the reference value, in accordance with Table 12 of HSG258.

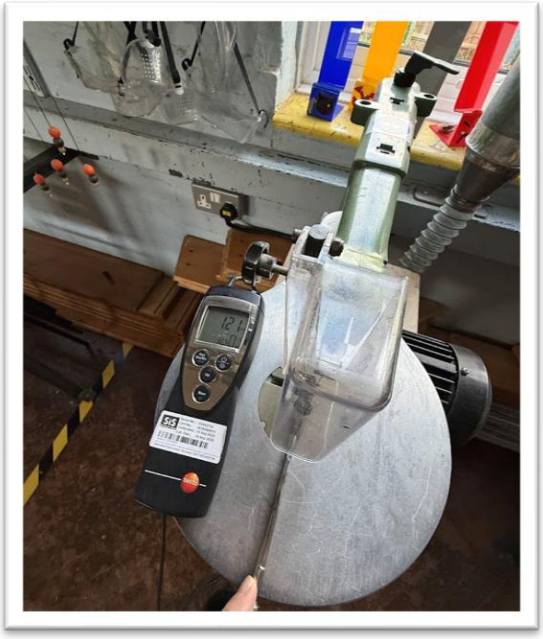
- **Flexible hose and vacuum systems**
  Smaller fretsaws are often connected to vacuum extraction systems and may incorporate significant lengths of flexible hose. A test point must not be drilled into flexible hose.

  Where practicable, a short section of solid duct should be installed to provide a suitable test point. Alternatively, the hose may be disconnected and velocity measured at the open end. The resulting volumetric flow rate should be compared with the manufacturer's stated duty to help determine whether the vacuum system is performing as intended.

- **Blade-slot velocity**
  Using a hot-wire anemometer, take measurements across the slot surrounding the blade at the machine table.

  These measurements should be regarded as **indicative rather than precise**, as the probe itself can partially obstruct the relatively small slot. The primary purpose of the measurement is to establish whether air is being drawn through the slot towards the lower extraction.

  The airflow calculated at the slot should not be expected to equal the volumetric flow measured in the extraction duct. Poorly fitting guards and openings around the lower enclosure can allow significant air leakage, reducing the proportion of air drawn through the blade slot.



- **Upper hood capture velocity**.
  Where an upper capture hood is fitted, take multiple velocity measurements across the hood face using a hot-wire anemometer. For a very small circular capture hood, a single representative measurement may be appropriate.

Qualitative Checks

Look for visible evidence of inadequate dust control, including:

- Dust accumulating on the machine table, surrounding surfaces or floor.
- Dust collecting beneath the machine table.
- Lower blade guarding that has not been returned to the correct position following a blade change.
- Guarding that obstructs or compromises the extraction path.
- An upper capture hood that cannot be positioned sufficiently close to the blade.
- Damaged, split or poorly connected ductwork and flexible hose.

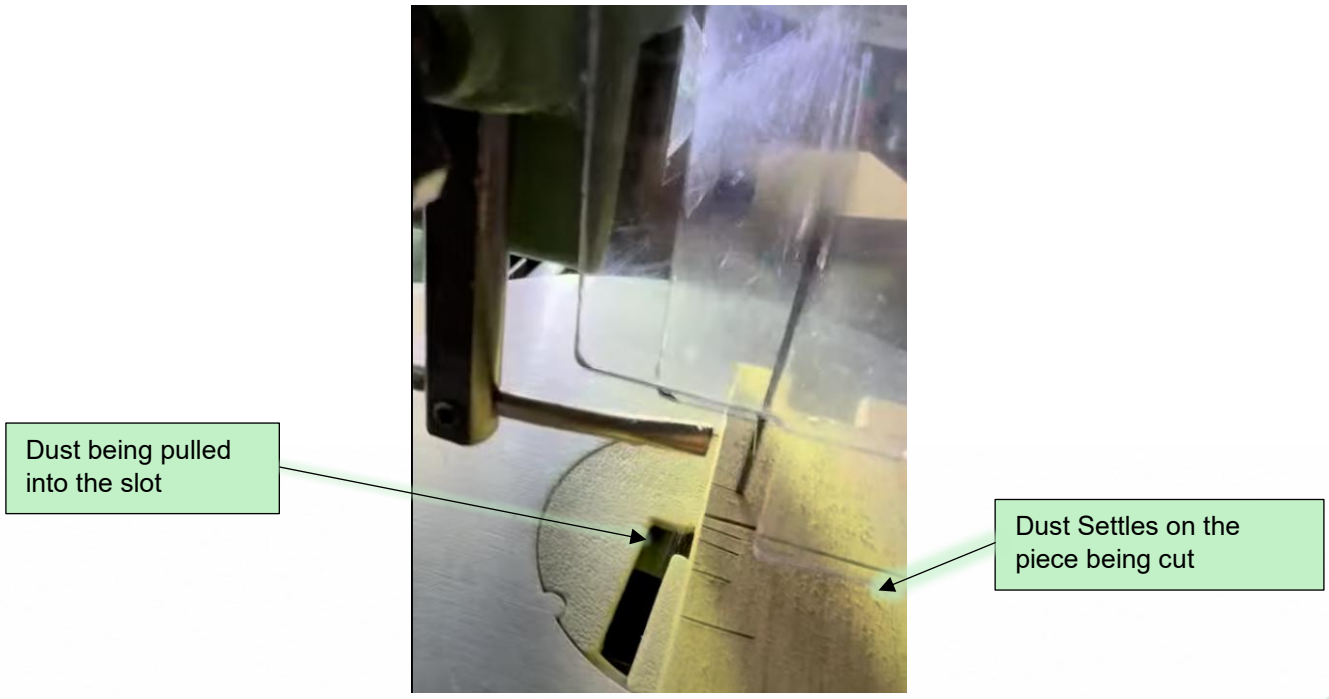
Where upper blade guarding is fitted, a **U-shaped guard** can help enclose the blade and reduce the amount of dust entering the operator's breathing zone.

Tyndall assessment

Ask the operator to carry out a representative test cut while observing the dust cloud using a Tyndall beam. Assess dust movement both **above and below the machine table**.

Pay particular attention to dust that settles on the machine table or workpiece. Vibration from the fretsaw can disturb this material and create secondary airborne dust emissions.

The assessment should establish whether dust is being drawn towards the extraction system or escaping into the surrounding workplace.



Recognising poor control

Indicators of poor control may include:

- No detectable velocity through the blade slot.
- No effective upper capture hood.
- Lower extraction positioned too far from the source.
- Dust accumulating beneath the machine table.
- Dust remaining on the machine table or workpiece.
- Blade guarding incorrectly positioned and interfering with extraction.

What does better control look like?

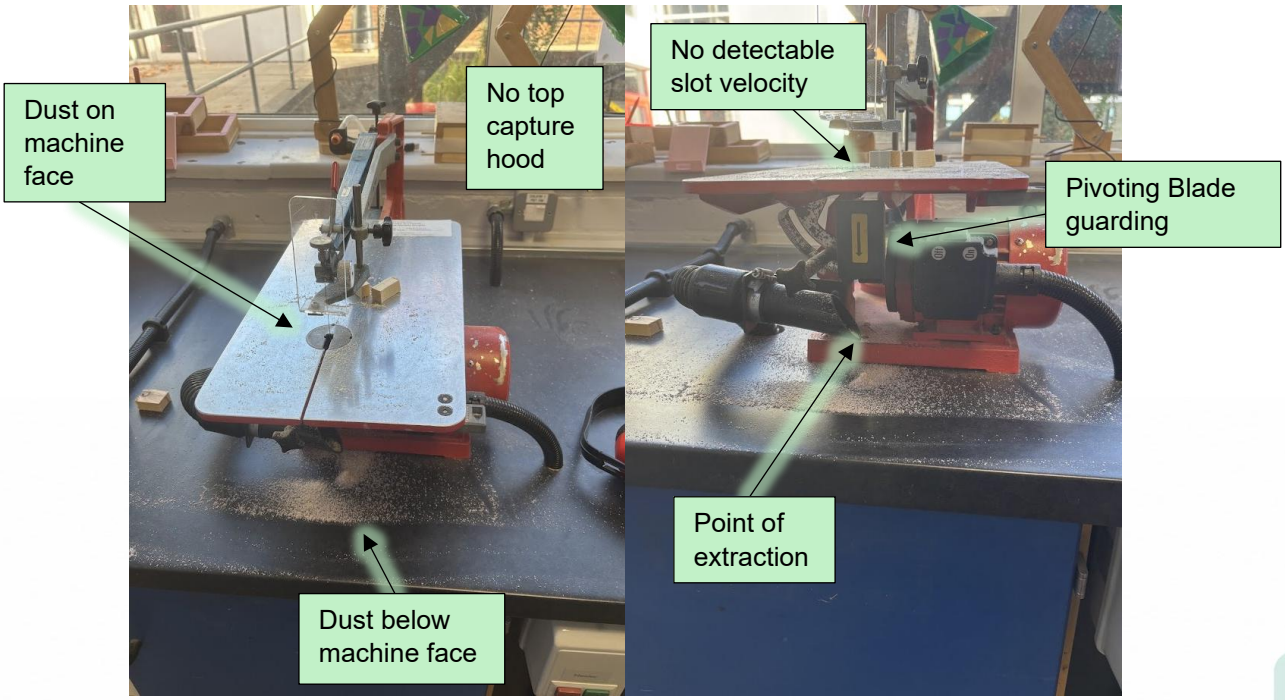
Better control is achieved when extraction is positioned close to the source and the lower section of the machine provides sufficient enclosure to encourage airflow through the blade slot.

An effective arrangement may include:

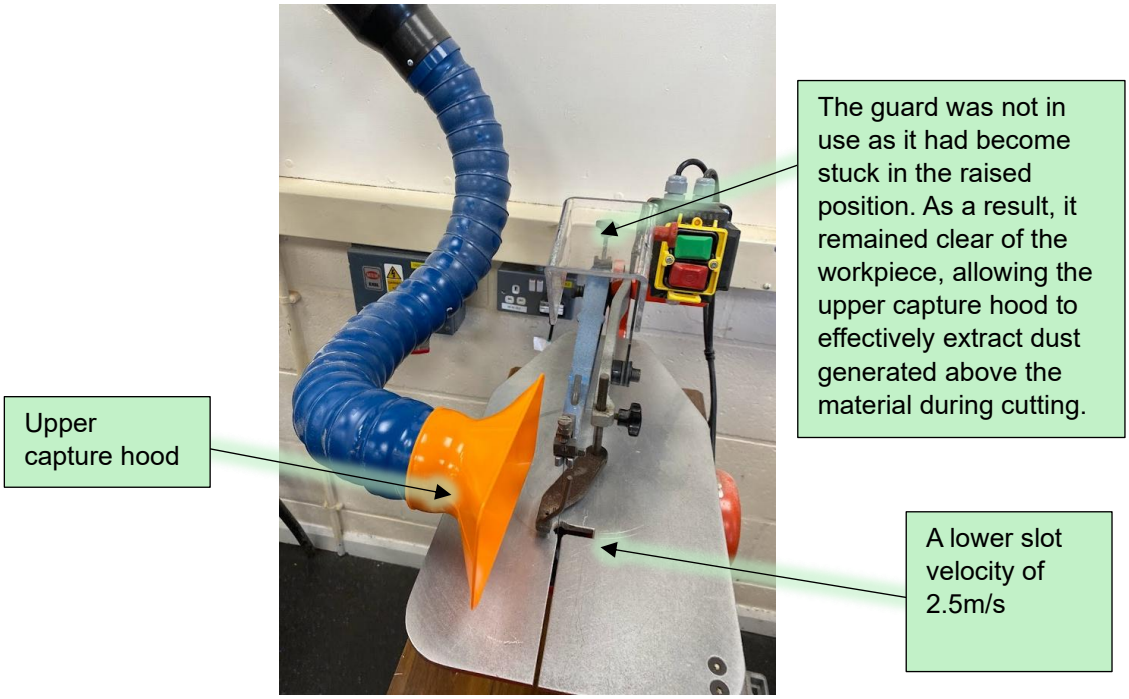
- A suitably enclosed lower extraction hood.
- Correctly positioned lower blade guarding.
- Detectable inward airflow through the blade slot.
- An upper capture hood positioned close to the point of cut.
- Sufficient clearance to allow safe operation and blade changes.

The objective is not simply to achieve airflow within the ductwork, but to demonstrate that **dust generated during cutting is being effectively captured and removed before it can disperse into the workplace or operator's breathing zone**.

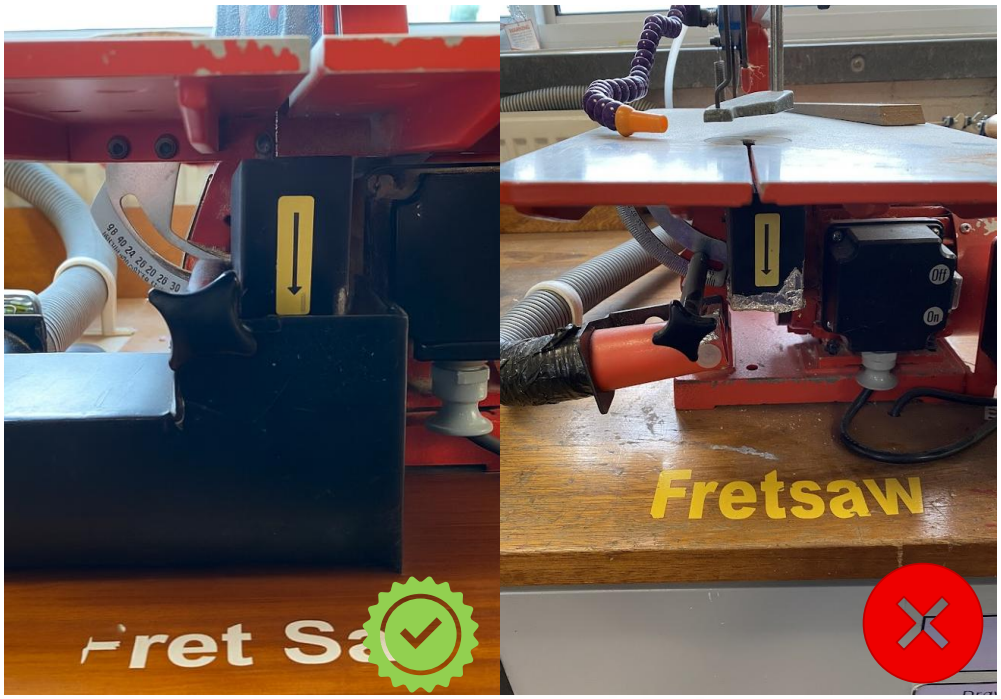
Example of poor control:



Example of better control:



Good and bad lower hoods:



The hood on the left provides greater enclosure around the lower blade area. With the blade guard in the upright position, good airflow was achieved through the blade slot, providing effective dust extraction while maintaining sufficient access for blade changes.

The hood on the right consists of a fixed, low-level extraction point positioned too far from the source to provide effective capture. No measurable air velocity was detected at the blade slot.

References

- L5. The Control of Substances Hazardous to Health Regulations 2002 (as amended) Approved Code of Practice and guidance. https://www.hse.gov.uk/pubns/priced/l5.pdf
- HSG258. Controlling airborne contaminants at work A guide to local exhaust ventilation (LEV). https://www.hse.gov.uk/pubns/priced/hsg258.pdf
- WIS31. Narrow band saws. Safe working practices. https://www.hse.gov.uk/pubns/wis31.pdf
- WD1. COSHH essentials for woodworkers. Bandsaw. https://www.hse.gov.uk/pubns/guidance/wd1.pdf
- L22. Safe use of work equipment Provision and Use of Work Equipment Regulations 1998. https://www.hse.gov.uk/pubns/priced/l22.pdf
- WIS23 (rev3) – Wood dust: Controlling the risks. https://www.hse.gov.uk/pubns/wis23.pdf
- EH40/2005 – Workplace exposure limits. https://www.hse.gov.uk/pubns/priced/eh40.pdf
- L114 – Safe use of woodworking machinery https://www.hse.gov.uk/pubns/priced/l114.pdf