Dust Control – John Woods

I've been involved in woodturning for a good number of years now. In that time I have noticed that many (most) long-term turners and wood trades people have some aspect of respiratory problems. Whether it is a sensitisation to a particular wood (or wood dust), having a persistent niggly cough, to more serious ailments. One particularly notable demonstrator I saw could no longer turn wood. Instead he had to turn synthetic materials.

Years ago, dust was considered as a nuisance by-product of the craft with little regard to safety and health.
It was known that dust can be explosive, usually when it was too late.
For some workers, all that was suggested for personal protection was to tie a handkerchief or scarf over your nose and mouth.

Fortunately we are now more aware of the hazards that dust can cause.

Risk Management *(relating to dust)*
There are five aspects to consider with Risk Management:

- **Identify hazards**
- **Identify who is at risk**
- **Assess the risks – and take action**
- **Record for future reference**
- **Review the Risk Assessment**

Identify hazards

i.e. anything that may cause harm.

Check for possible physical, mental, chemical, biological and environmental hazards.
These are common classification of hazards:
Physical: e.g. lifting, awkward postures, slips and trips, noise, dust, machinery, etc.
Mental: e.g. excess workload, long hours, working with high-need clients, etc. These are also called 'psychosocial' hazards, affecting mental health and occurring within working/domestic relationships.
Chemical: e.g. solvents, paints, oils and finishes, etc.
Biological: including respiratory, dermatology, allergies, even hypothermia.
Environmental: access/exit routes, obstructions, fire, asbestos, ventilation.

Decide who may be harmed, and how.
Identify who is at risk.

- As well as yourself, consider any other person who is helping or working with you.
- Include any visitors – e.g. friends, grandchildren.

Assess the risks and take action.
How likely it is that each hazard could cause harm.

- Consider how you can reduce the level of risk, and take appropriate action.
- After taking all precautions, some risk may remain. You must decide the level of risk (and who it remains a risk too) for each remaining hazard - high, medium or low. Can it be improved, cordoned off, or removed ?

Make a record of the findings.

- *Employers with five or more staff are required to record in writing the main findings of the risk assessment. This record provides proof that the assessment was carried out, and is used as the basis for a later review of*

working practices. The risk assessment is a working document. You should be able to read it. It should not be locked away in a cupboard.

- Even if you are not an employer, it may be useful to record you assessment. It can act as a reminder to re-assess, and provide a reference for next time.

Review the risk assessment.

A risk assessment must be kept under review in order to:

- ensure that safe working practices continue to be applied, and
- take account of any new machinery, changes to the environment or more demanding targets.

Risks

All inhaled wood dust is hazardous to your long-term health.

Wood Dust can cause:

allergies, respiratory problems, cardiac problems, skin conditions, eye problems.

It can also be a slip hazard and an explosive hazard.

Hazard Prevention

At source

- As much as possible, solve the problem at source.
- Don't create dust

Capture the dust created at source

Personal protection

Your respiratory system is for breathing – not filtering dust.

- Wear Respiratory Protective Equipment (RPE).

Environment

- Airborne dust can be filtered, but this does not alleviate the need for personal protection. This is a third level solution.
- Settled dust is also a hazard, and cleaning this up generates a further hazard.

Practicalities

Solving problem at source

- Sharp tools and correct techniques produce shavings, not dust.
- 'Green' wood does not produce dust - until it starts to dry while being worked (natural air drying, turning thin, and abrading).
- Use extraction and a capture funnel/hood to try and collect dust, shavings, abrasives, polishing 'cloths' and anything else that is loose. In the HSE guides this is classed as Local Exhaust Ventilation (LEV).
- Various designs and shapes of hood are available or can be improvised. Almost without exception, this method does not capture all of the dust. Hoods can be the wrong shape or size for the workpiece, or wrongly positioned for the workpiece.
- In practice, extractors are often switched off a lot of the time because they are noisy - caused by motor noise and/or induction noise. This can be reduced by situating the extractor outside the workshop area or in a sound insulated area and ducting through to the work area.
- Use oil or wax when abrading. This makes dust heavier so is less likely to get airborne. When you start to so airborne dust, re-oil/wax before continuing.

Personal protection

- Wear Respiratory Protective Equipment (RPE).

- Various types of RPE typically available for woodturners:
- Disposable half mask. A simple mask that covers the mouth and nose. Plain material or with a valve.
- Re-useable half mask. Usually incorporating replaceable filters
- Full face mask. A half face mask with additional eye protection.
- Full Face powered helmet - incorporating a fan and filtration. These may have a built in battery pack, or a belt mounted battery pack. Some have the fan incorporated with the belt mounted battery pack.
- Particle filters (not gas/vapour filters) are classified according to their efficiency.
  P1 = Low efficiency
  P2 = Medium efficiency
  P3 = High efficiency

P3 - High efficiency filters are required for protection against wood dust

- For safety, wear RPE while working, while cleaning the work area, and while removing dust from clothing.

Environment

Once the dust is airborne, volume filters can help to clean the air. Popular main brands being 'Microclene', Jet, and Record. Ideally these need to be left working for a while after the work area has been vacated to reduce airborne dust to a minimum.

These do not alleviate the need for personal protection.

Settled dust (and shavings) can cause a slip hazard, depending on the floor or floor covering. Consider using safety matting to reduce this risk. This can also make it more comfortable to stand at the lathe for any length of time.

Use a vacuum to clean up settled dust. A brush or 'pressurised air flow' will disturb settled dust to create a hazard. (I didn't know the best term to use to describe a draft from an open door/window, or extractor/vacuum cleaner exhaust air flow, or the use of an air-line). Again, keep using RPE while cleaning up.

Dust control equipment

- RPE has already been described.
- Chip collectors – high volume air flow to collect shavings
- Dust extractors – high suction pressure to capture dust. Good filtration of the exhaust air (depending on the filter type). Usually at least a two-stage filter. Some may include an ultra-fine (HEPA) filter.
- Adding a 'drop box' or cyclone system allows larger particles to be captured before the filters, so the filters last longer and work more efficiently.
- Ducting – air/dust movement in some ducting systems may create static electricity. This in turn may cause the dust to explode. In industry, metal ducting bonded to an electrical 'earth' is used to alleviate this problem.

- **Other discussion points:**
- Peters RPE solution – using a wall fan to blow fresh air into a full face helmet
- Peters extraction solution – a hole in the wall behind the lathe with a fan blowing everything outside.
- Ducting the exhaust air outside – quieter, and no secondary dust contamination, but loses heat from the workshop
- Airborne filtration – number of air changes
- Capture Hood design

Reference Material

- Bill Pentz website: http://billpentz.com//woodworking/cyclone/index.cfm
- The Wood Database website: http://www.wood-database.com/wood-articles/wood-allergies-and-toxicity/
- Wood Toxins and Effects: www.dave-wilcox.com/Woodturning/toxics.aspx (not working 19 Dec '17)
- HSE wis1 - Wood Dust - hazards and precautions
- HSE wis23r1 - Wood dust controlling the risks
- HSE wis30 - Toxic woods
- HSE wis6 - COSHH and Woodworking
- HSE hsg53 - Respiratory Protective Equipment at Work
- HSE wis14 - Selecting Respiratory Protective Equipment
- HSG 258 - Controlling airborne contaminants - A guide to LEV
- HSE INDG408 - Clearing the air
- HSE INDG409 - LEV pocket guide for workers
- HSE wis32 - Safe collection of wood waste
- Effect of ventilation design on removal of particles in woodturning workstations: www.sciencedirect.com/science/article/pii/S0360132308000255

Novel dust 'hood' solutions (but only practical for spindle turning)**:**

- http://lumberjocks.com/projects/72268
- http://www.woodcraft.com/product/158532D/lathe-dust-collector-downloadable-plan.aspx

Equipment examples:

Full face powered helmet – Trend Airshield Pro - from Trend UK

Jet AFS-1000B Air Filtration System – from Axminster Tools (Order code: 310481)

Dust Extraction system (with Cyclone and Fine Filter) - from Axminster Tools (Order code: 505087)