

# Wood dust

Dr Bob Loss

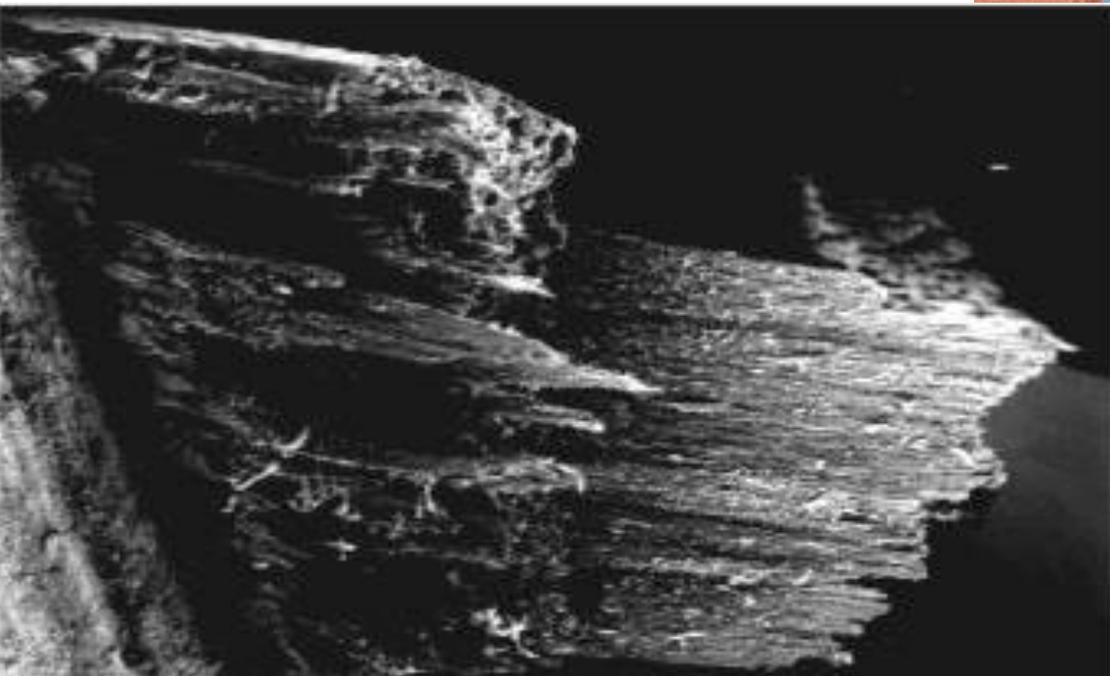
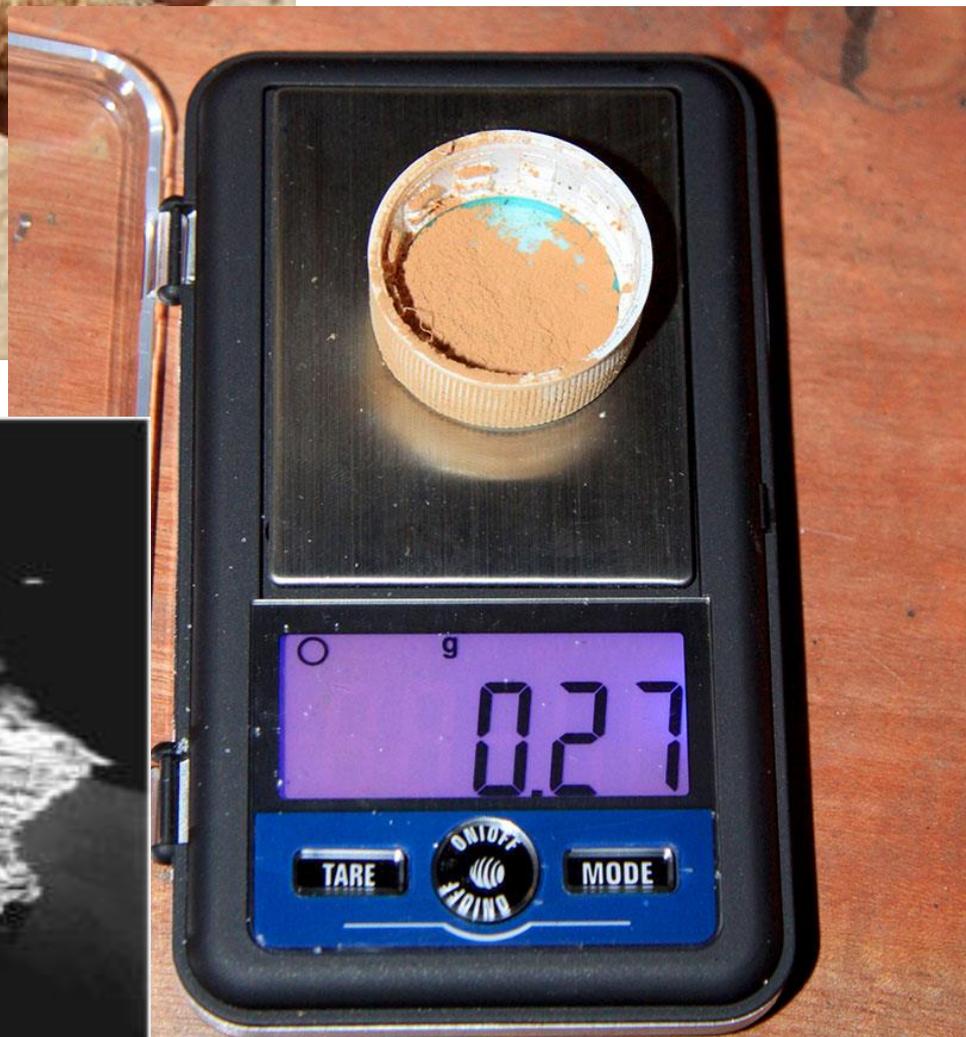
Manning Men's shed

# Useful Links

- Wood dust Guru Extraordinaire  
[billpentz.com/woodworking/cyclone/index.cfm](http://billpentz.com/woodworking/cyclone/index.cfm)
- Corrimal Mens Shed Cyclone Installation  
[mastslav.weebly.com](http://mastslav.weebly.com)
- Wood Workers Forums Australia  
Dust sub-forum  
[www.woodworkforums.com/f200](http://www.woodworkforums.com/f200)

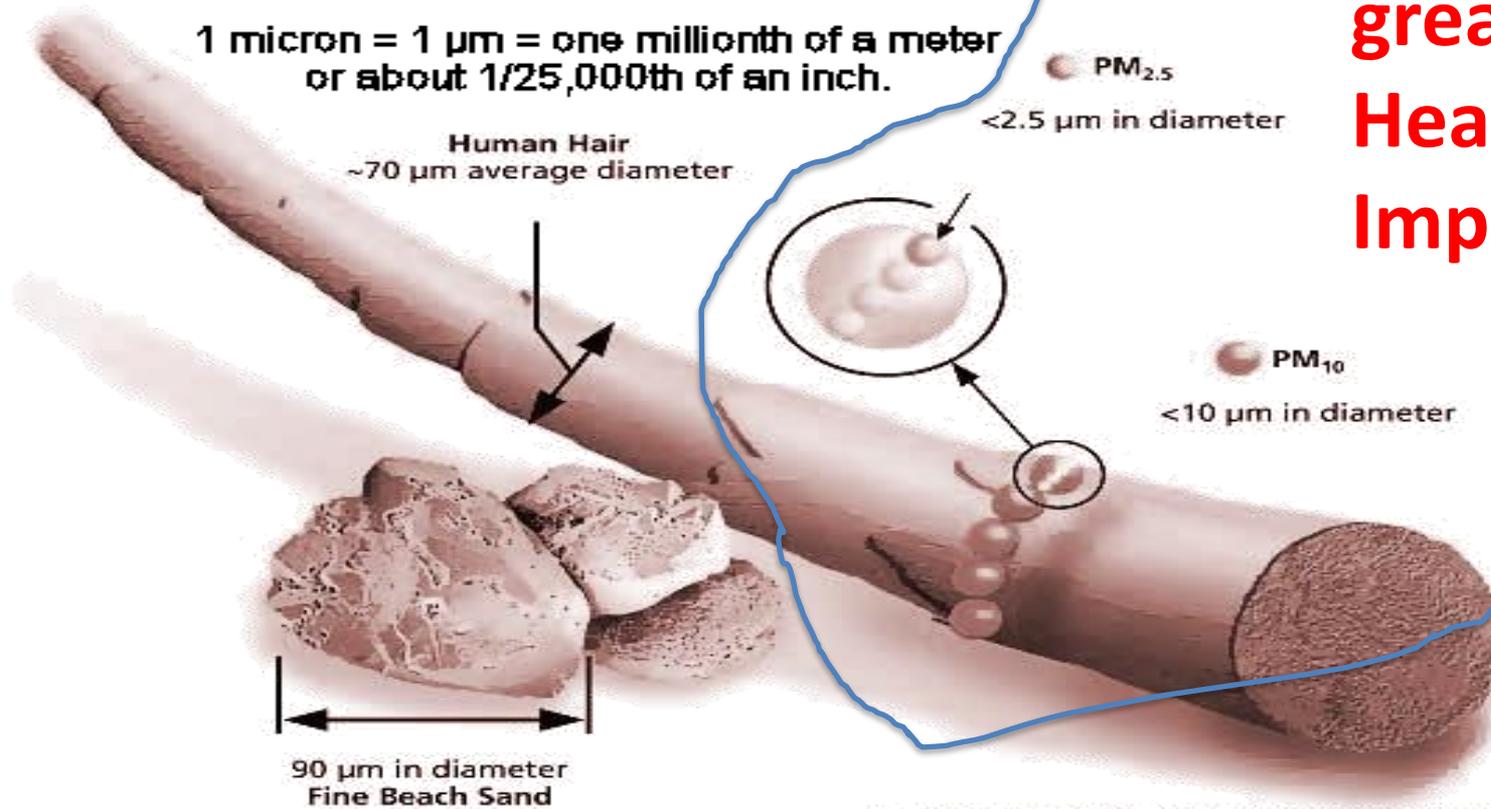
# Wood dust

- What is it – particle sizes, distributions \*
- Health aspects – effects, rec. exposure levels \*
- Extraction aspects\*
  - Dust extractors
  - Machinery dust port improvements
  - Ducting systems
  - Air flow
  - Dust monitoring



# How big are sawdust particles?

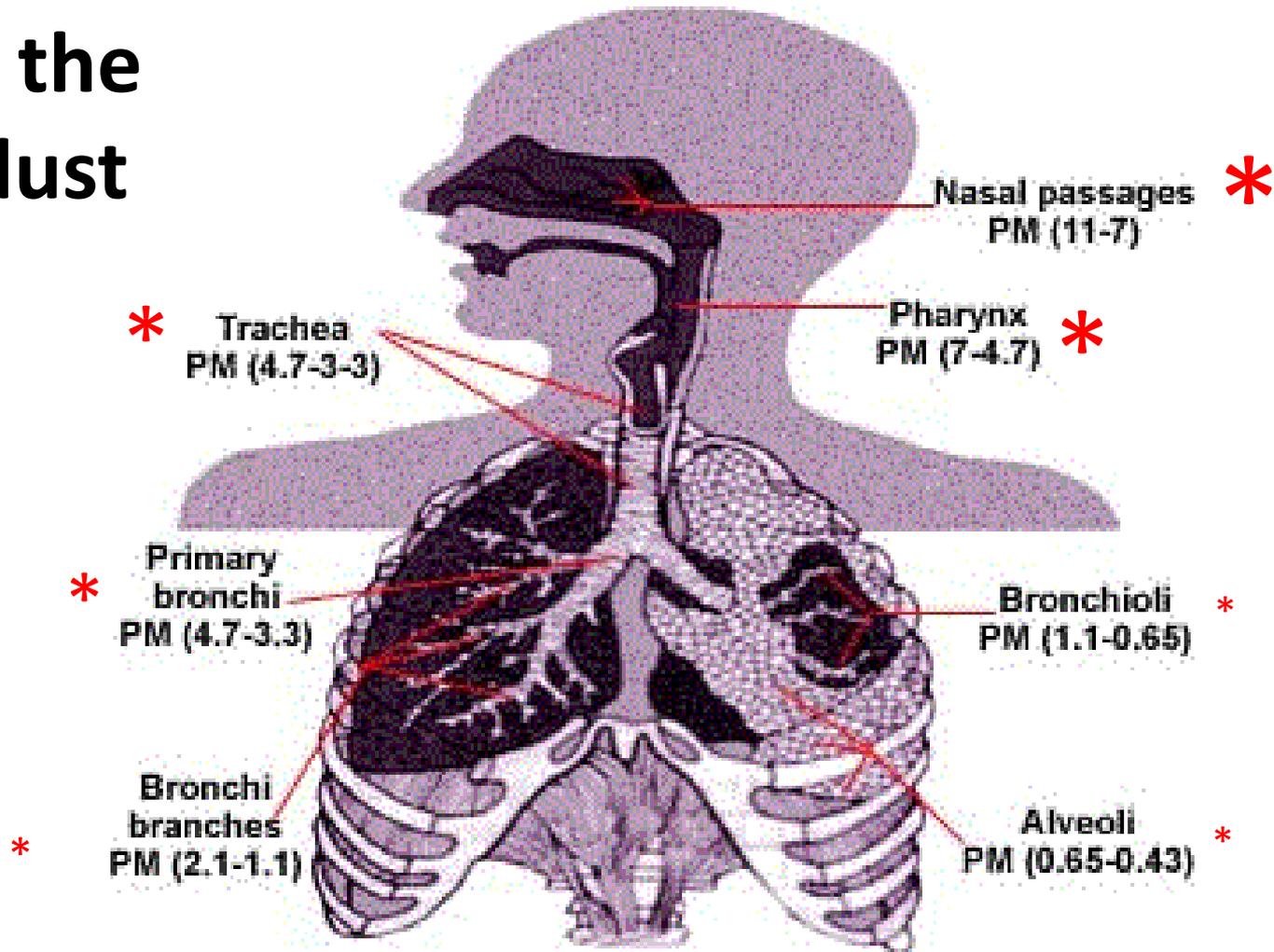
**Invisible  
and  
greatest  
Health  
Impact**



*Image courtesy of EPA, Office of Research and Development*

1 mg wood dust = ~20 million particles of 5 micron size,  
~2 **billion** 1 micron particles

# Where does the sawdust go?



**Disposition of Particulate Matter (PM)  
in the Respiratory system  
(Richard Wilson, Harvard Press, 1996)**

**+ PM<sub>2.5</sub> implicated in  
general mortality**

# Recommended exposure limits

There is no clearly definable “wood dust epidemic” . . .

BUT

1994: International Agency for Research on Cancer (IARC) classified wood dust as a human carcinogen (causes sino-nasal, lung and stomach cancers)

2002: US Federal Govt (National Institute for Health ,NIH) adds wood dust to it's latest list of KNOWN human carcinogens in Annual Report on Cancer.

2017: Aust OHS exposure recommendations– “dated” and “need work”

**based on European** "like beech and oak”

**hard wood 1 ppm** (1 mg/ m<sup>3</sup>) **soft wood 5 ppm**

MDF recommend is **0.3 ppm**

DOES NOT take into account the added toxicity of Australian timber

DOES NOT take dust particle sizes into account.

# Airborne Dust Recommendations

- US **OSHA** : Wood dust **5 ppm** (PM<sub>30</sub>) /Day;
- American Conference of Governmental Industrial Hygienists (**ACGIH**) **0.5 ppm** for WRC

## All Dust

- US EPA is **0.15 ppm** (PM<sub>10</sub>) , + **0.035 ppm** (PM<sub>2.5</sub>)
- WHO recommend 0.05 ppm (PM<sub>10</sub>) and 0.025 ppm (PM<sub>2.5</sub>) for **seniors** and children.
- Perth ann. avg. is 0.017 ppm (PM<sub>10</sub>), Northern Nigeria is 0.50+ ppm

Industry or job group	N	mean (mg/m <sup>3</sup> )	Min. (mg/m <sup>3</sup> )	Max. (mg/m <sup>3</sup> )
ALL Furniture	496	7.22	< 0.02	286
<b>Lathe operator</b>	<b>11</b>	<b>33.1</b>	<b>1.43</b>	<b>286</b>
Sander, nec	127	10.5	< 0.02	131
Cabinet maker	21	5.74	0.3	15
Sander, hand	23	7.88	0.14	65.4
Wood worker	20	10	0.5	58.4
Router operator	13	5.66	0.48	28.3
Saw operator, nec	26	4.21	< 0.02	27.7
Saw operator, rip	11	0.71	< 0.02	1.61
Vocational instructor	18	0.72	<0.02	4.25
Construction carpenter	12	47.3	0.05	538

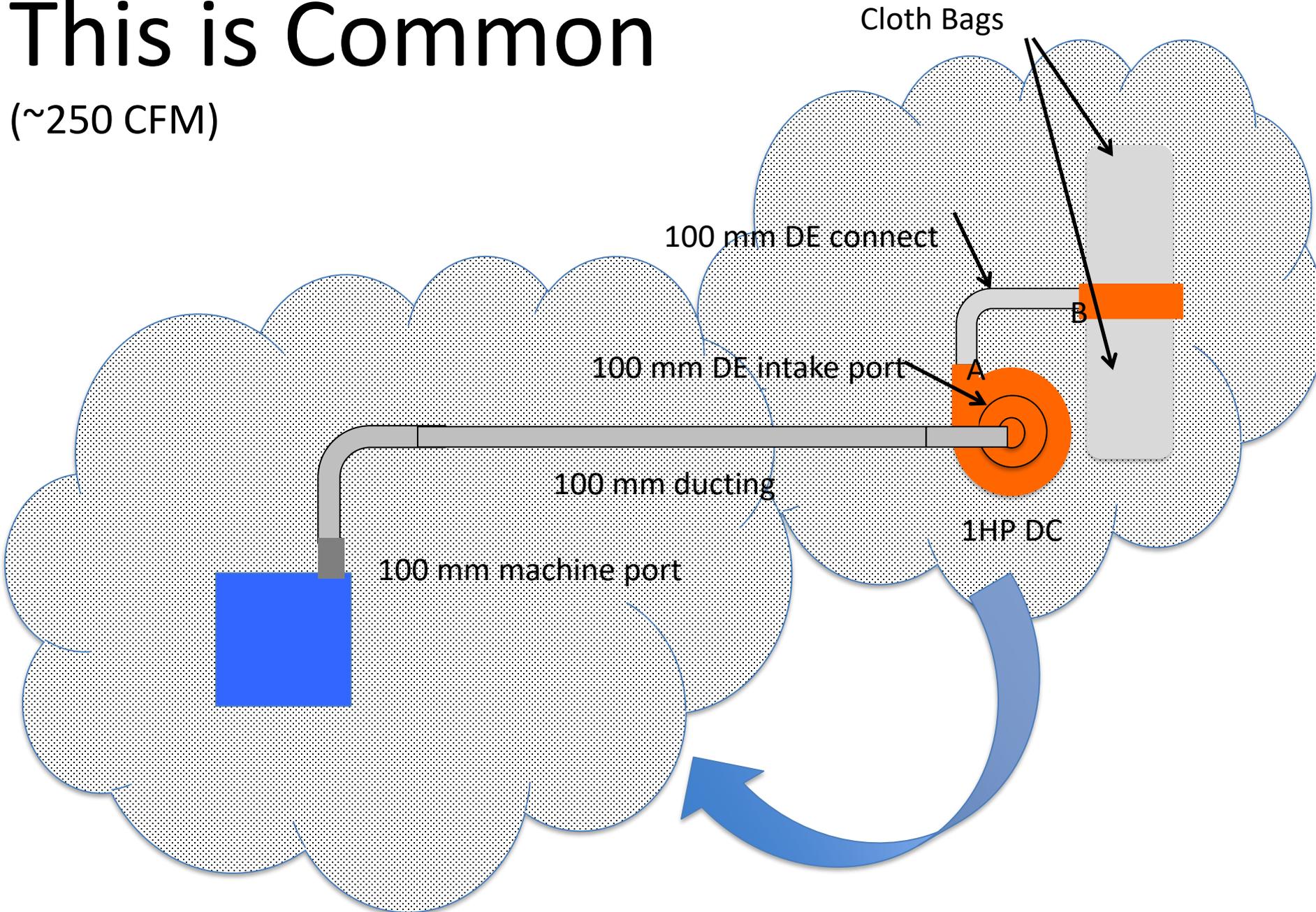
OHS recommended is 1 mg/m<sup>3</sup> for hardwood, 0.5 mg/m<sup>3</sup> for RC and 0.3 mg/m<sup>3</sup> MDF

# To Capture and vent invisible dust

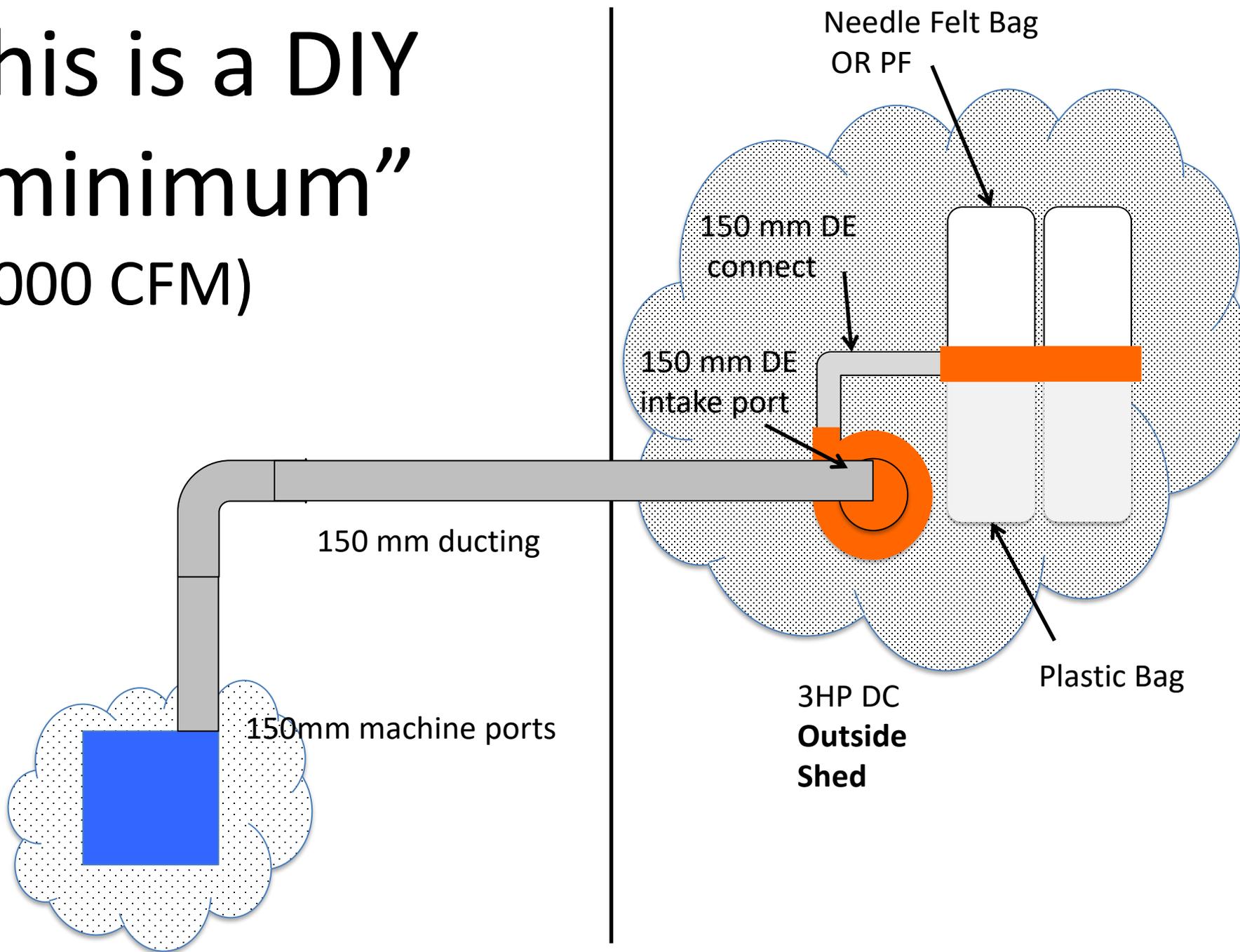
- 1000 cfm @ 4000 fpm recommended for machinery, more for larger machines.
- Manufac. specs on DC air flow highly inflated
- Flow depends on; DC power, Ducting and DC/Machine port size
- 2" = 120 cfm, 4" = 420 cfm, 6" = 1250 cfm.
- In DIY situation - 3HP 12" impeller, Larger sheds - need bigger impeller/motor.

# This is Common

(~250 CFM)



# This is a DIY “minimum” (1000 CFM)



	Summary	
Device	Recommendation	Comment
Minimum ducting diam	6"	Keep length to minimum
Minimum DC HP	3	Regular maintenance required
Minimum DC intake port size	6" or multiple 4" ports	Some surgery to enlarge ports may be required
DC vent location	Outside shed	Well away from major opening to shed
DC bags	Depends on location of DC	Use plastic bags for bottoms
Pleated filters	Depends on location of DC	Only necessary when external DC venting not possible
Cheap vaccum cleaner	Not recommended	Regular cleaning and maintenance required
Genuine HEPA fliter Vacuum cleaner	Recommended on power tools only	Regular cleaning and maintenance required
Chip collector/dust trap/Small Cyclone	Not recommended	Increases back pressure and reduces flow - can help keep filters clean for longer
Large well designed Cyclone	Yes	Expensive
Flexible ducting	Avoid	Keep length to absolute minimum for connections
Ducting Connections	Keep to minimum	Use large radius bends
Machine port size	should match ducting size	Some surgery to enlarge ports may be required
Auto machine/Vac switch	Not recommended	Run all DC for 15 - 20 minutes after last dust making activity
Mask	Recommended	Last resort
Ventilation	Recommended	Cross wise Preferred



Thanks for listening

# Wood dust investigations 2012-15

- 21 DIY and commercial Workshops
  - 8 DCs with needle felt filters,
  - 9 with Pleated Filters,
  - 9 with cloth bags,
  - 19 Vacuum cleaners,
  - 2 room air filters,
  - 2 full face masks.
- Extensive flow testing of DCs, cyclones, junctions flexy and ducting