Dust Collection 101

What and Why?
How to do it
The Reality
Why Me

• Biography
Why Me

- Biography
- I am willing
Why Me

• Biography
• I am willing
• I have limited experience
Why Me

• Biography
• I am willing
• I have limited experience
• I know some of what not to do
What

• What is “dust”
• Why collect it
• How do I collect it
What is Dust

• Wood working “dust” falls into 3 categories
  – Shavings and chips
  – Saw dust
  – Dust less than 100 micron size
What is Dust

• Shavings and Chips
  – Chisel
  – Planer
  – Jointer
  – Hand Plane
  – lathe
What is Dust

• Shavings and Chips
  – Chisel
  – Planer
  – Jointer
  – Hand Plane
  – Lathe
  – Drops to floor or bench top, easy to contain
What is Dust

• Shavings and Chips
  – Chisel
  – Planer
  – Jointer
  – Hand Plane
  – Lathe
  – Drops to floor or bench top, easy to contain
  – Need power and high air velocity
What is Dust

- Shavings and chips
- Saw dust
  - Table saw
  - Band saw
  - Radial arm saw
  - Circular saw
  - Hand saw
What is Dust

• Shavings and chips
• Saw dust
  – Table saw
  – Band saw
  – Radial arm saw
  – Circular saw
  – Hand saw
  – Drops to the floor,
What is Dust

• Shavings and chips
• Saw dust
  – Table saw
  – Band saw
  – Radial arm saw
  – Circular saw
  – Hand saw
  – Drops to the floor
  – Easy to capture, maintain air velocity
What is Dust

• Shavings and chips
• Saw dust
• Dust 100 micron and smaller
  – All of the above
What is Dust

- Shavings and chips
- Saw dust
- Dust 100 micron and smaller
  - All of the above
  - Airborne, difficult to contain
What is Dust

• Shavings and chips
• Saw dust
• Dust 100 micron and smaller
  – All of the above
  – Airborne, difficult to contain
  – Need large air volume, collector design important
What is Dust

• Shavings and chips
• Saw dust
• Dust 100 micron and smaller
  – All of the above
  – Airborne, difficult to contain
  – Need large air volumn, collector design important
  – This one is the health hazard
Why

• Housekeeping
Why

• Housekeeping
  – Cleanliness is next to godliness
Why

• Housekeeping
  – Cleanliness is next to godliness
  – Safety
    • Slip hazard
Why

• Housekeeping
  – Cleanliness is next to godliness
  – Safety
    • Slip hazard
    • Fire Hazard
Why

- Housekeeping
  - Cleanliness is next to godliness
  - Safety
    - Slip hazard
    - Fire Hazard
  - Proper machine operation
Why

• Housekeeping
  – Cleanliness is next to godliness
  – Safety
    • Slip hazard
    • Fire Hazard
  – Proper machine operation
  – Health
The Health Hazard

• The primary long term disease risk from wood dust is fibrosis which comes from the long term damage from very fine dust particles. The U.S. Environmental Protection Agency (EPA) in their Epa PM2.5 NAAQS Implementation says fine dust particles sized 2.5-microns and smaller pose significant long term risks
The Health Hazard

• The accumulation of fine wood dust in our airways and lungs creates long term problems similar to asbestos and fiberglass inhalation.

• The medical research is clear there is no safe level of wood dust exposure because every fine wood dust exposure creates some measurable damage and some of this damage becomes permanent. The amount of damage depends upon our general health, how much we take in and for how long.

• From ClearVue Website
How

- Broom and shovel
- Shop Vac
- Bag system
- I chose a Cyclone Collector
My Cyclone Collector

First:
  Shop Layout
My Cyclone Collector

First:

Shop Layout

Second:

Dust collector design
Dust Collector Design

• Requirements
  – Collect the “dust”
Dust Collector Design

• Requirements
  – Collect the “dust”
  – Central system
Dust Collector Design

• Requirements
  – Collect the “dust”
  – Central system
  – DIY compatible
Dust Collector Design

• Requirements
  – Collect the “dust”
  – Central system
  – DIY compatible
Dust Collector Design

• Requirements
• Cyclone- Which one?
  – Onieda, Grizzly, Penn State or ClearVue
Dust Collector Design

• Requirements
• Cyclone- Which one? ClearVue
• Collection system ductwork?
  – Ductwork Layout
Dust Collector Design

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Dust Collector Design

• Requirements
• Cyclone- Which one? ClearVue
• Collection system ductwork?
  – Ductwork Layout
  – Ductwork design
    • CFM requirements
    • FPM Requirements
    • DP Limitations
Dust Collector Design

• Requirements

• Cyclone- Which one? ClearVue

• Collection system ductwork?
  – Ductwork Layout
  – Ductwork design
    • Picked Bill Pentz as an expert and ClearVue as vendor and design help
Dust Collector Design

• Ended up with:
  – ClearVue 5Hp cyclone
  – PVC S&D PVC pipe
  – Pipe sizing as recommended by Ed Morgano and Bill Pentz
The Reality

• What I really do
• What I should do
• Consequences
My Dust Collector!
First view of my shop when you step in the door
My Dust Collector!

View to the left just inside the door.
My Dust Collector!

Lathe connection works really well for capturing sanding dust. But for spindle work is marginal and for face work a little better than marginal. I take the flex tube and move it around to suck up the shavings, works well.
My Dust Collector!

Temporary 4” connection for spindle sander. Works very well. Some day I will build a table for the sander and a new dust connection.
My Dust Collector!

6” main line connection split in two 4” ducts, one for the floor sweep and one used for the router table.
My Dust Collector!

- 4” connection for table saw, works well.
- There is no cover for the saw back where the motor is mounted.
My Dust Collector!

• Band saw connection shares a 6” main line connection with the jointer.
• Keeps internal very clean
• But, need to capture table top dust
• Resawing causes a lot of table top dust.
My Dust Collector!

- Planer has 4” connection direct to 6” main line.
- Note green wire from flex tubing reinforcing wire to planer case.
- This is the only place in my shop that I had a static shock.
Static electricity

• First, if you like to read, go here: http://mywebpages.comcast.net/rodec/woodworking/articles/DC_myths.html. This is an article by Dr Rod Cole that discusses the myths surrounding static electricity and PVC pipe.
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• From my research:
  – Dust transport in PVC does generate static electricity and can cause an irritating shock
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• From my research:
  – Dust transport in PVC does generate static electricity and can cause an irritating shock
  – There is not enough energy to ignite the dust
  – The NFPA code requirement is for air flow of 1500 CFM
My Dust Collector!

- 6” jointer, with 4” flex tubing to 6” main line.

- Should enlarge cavity where tubing is connected.
My Dust Collector!

Jointer and bandsaw share a 6” main line connection.

There is plenty of air, but the bandsaw needs table top collection.
My Dust Collector!

Radial arm saw, 6” line direct to cyclone. Works well.
Some day I may streamline the collector box.
My Dust Collector!

Router table has 4” connection to 6” main, works well for operations on board edges
My Dust Collector!

Connection for floor sweep and router table
My Dust Collector!

- Clyclone and filters.
- Filters are 300 square feet each and are rated for .5 micron.
- 30 gallon trash can
My Dust Collector!

Main line from the cyclone goes above the ceiling for distribution.
My Dust Collector!

Ceiling mounted air filter. .5 um.
Suggested Sources

• Wood Shop Dust Control by Sandor Nagyszalanczy
• Billlpentz.com
• Clearvuecyclones.com
• Manufacturer webcites, Onieda, Grizzly, PennState, etc.
THE END