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MakeHaven Woodshop Configuration, Housekeeping and Dust Mitigation Procedures

Updated 6/04/2018

Configuration of Shop Dust Control

The containing building, 770 Chapel, has a sprinkler system and zoned fire alarm system.

Chart 1
CFM requirements for diameter at specified velocity.

Dia.	3500 FPM	4000 FPM	4500 FPM
3"	170	195	220
4"	300	350	390
5"	475	550	610
6"	700	785	880
7"	950	1100	1200
8"	1200	1400	1570
9"	1550	1800	1990
10"	1900	2200	2450
12"	2800	3175	3600
14"	3800	4300	4800

Standing Tools

Based on documentation “How to Design your Air Handling System” from Air Handling Systems the table saw, jointer and planer all require 350 CFM at 4000 FPM since they have 4” dust ports.

A) Duct Velocity. (Use the chart below to determine the Velocity of your system.)

Type of Dust	Velocity in Branches	Velocity in Main
Metalworking Dust	4500 FPM	4000 FPM
Woodworking Dust	4000 FPM	3500 FPM
Other Light Dust	4000 FPM	3500 FPM

Tools connected to dust collector (3 tools x 350 CFM = 1050CFM)

- Table saw 350 CFM
- Jointer 350 CFM
- Planer 350 CFM

The dust collector is a 3 hp cyclone dust collector (Jet model JCDC-3) with two stage separation and pleated filter which captures even the smallest particles down to 1 micron. The collector is rated by the manufacturer as proving airflow 1,240 CFM @ 8" of static pressure. Tools will not be used simultaneously, gates will be used to isolate tools for dust collection and supply adequate airflow.

ShopVac Tools

Tools using dedicated shopvacs as specified by manufacturer. Whenever practical ShopVacs will have automatically activated switches to ensure usage. We will use a 5 Gallon 2.5 Peak HP Shop-Vac (Model MAC12-250 as pictured) has manufacturer's airflow max of 60 CFM. (6 tools x 60CFM = 360 CFM)

- Small CNC
- Panel saw
- Miter saw

- Band saw
- Band saw #2
- Vertical Belt Sander
- **6 tools x 60CFM = 360CFM**

The Gerber Sabre Router CNC will be on a larger model (Shop-Vac 10 Gallon 5.0 Peak HP SS14-500A) which produces 70 CFM.
360CFM + 70CFM = 430CFM on ShopVacs

These ShopVacs are equipped with a pleated style cartridge dust filter (TYPE U - 9030400) as pictured.

Tools not producing dust and not requiring dust collection (but will be hand vacuumed after each use)

- Lathe
- Drill press

1050CFM of dust collector connected + 430CFM of ShopVac connected = **1,480CFM total.**

NFPA- 664

With total required CFM below 1,500 the NFPA-664 does not apply.

1.1.2* This standard shall apply to woodworking operations that occupy areas of more than 465 m^2 (5000 ft^2) or where dust-producing equipment requires an aggregate dust collection flow rate of more than 2549 m^3/hr (1500 ft^3/min).

For better housekeeping it would be desirable to have branch of 6 inch duct that terminates in a wide hood at the floor. It will be closed when not in use and therefore, is not included in computing total air volume.

Particulate Management

NIOSH approved toxic dust respirators and filtering facepiece masks will be made available.
Ongoing monitoring of particulate will be achieved with a Foobot air monitor which provide use a light scattering low latency detection sensor for particulate size range of 0.3 µm to 2.5 µm (PM 2.5) and density range 0 to 1 300 µg/m³ ; Precision ±4µg or ±20%.
The air monitoring device is a smart device and can be setup to automatically engage other particulate management systems such as powered filters and exhaust fans as needed.

Housekeeping Procedures

- As a usage requirement enforced by the RFID access control system and policies, all users review a series of safety videos and meet with shop coordinator prior to gaining access. These include tool specific instruction on proper use of the dust control system and cleanup procedure after use.
- Dust bins and ShopVac containers are monitored daily and will be emptied in intervals sufficient to keep the premises clean.
- Shopvac filters will be cleaned weekly or whenever inspection indicates cleaning is necessary.
- The dust collector (Jet model JCDC-3) has a internal rotary filter cleaning system which will be utilized weekly or after sufficient use.
- During daily (M-F) inspection visible horizontal surfaces including table tops and floors will be evaluated for dust accumulation and cleanup will occur if necessary.
- Elevated horizontal surfaces (lights, cabinet tops, ducting) will be examined and cleaned monthly or whenever activity is sufficient to warrant cleaning.
- Shopvacs with filters and a floor sweep will be available for additional cleanup.
- Tool users will be instructed to clean up any escaping sawdust manually with a vacuum after concluding use with any tool.
- Compressed air is not to be used for dust cleanup.
- Disposal of sawdust will be by consolidating in garbage bag and depositing in an outside dumpster for which MakeHaven maintains a regular refuse collection contract.

Tool Usage

- MakeHaven activities are focused on craft, and prototyping, not acting as a factory. As a hobby shop dust production will be much lower than a commercial setting.
- The site has RFID based access control. In addition we will be installing access control for individual tools where appropriate. The list of tools in the woodshop identified for RFID control are: table saw, planer, large CNC, panel saw, miter saw, sliding miter saw and lathe.
- Respiratory protection equipment (dust masks) will be made available, and required when sanding.
- When dust is being produced two 1044 CFM Air Filtration Systems will circulate air to remove escaping particulate.
- No metal cutting will occur in the designated woodshop area.
- Woodshop shall be periodically reviewed and comply with nationally recognized good practice.

Member Agreement Tool Usage and Safety Rules

MakeHaven has been in operation since 2012 with early versions of these rules. The following is an excerpt from the Membership Agreement and Safety Document which exemplify the types of procedures we put in place.

Tool Usage

Before using any machine the member is responsible to check the MakeHaven machine directory and ensure they have the appropriate required badge to use the machine. All tools and machines that require a badge are noted on the website at http://makehaven.org/inventory. These machines can only be used once the member completed the necessary requirements and received their "required equipment badge" for the individual machine.

Types of requirements:

- **Badge Required Tool** - Required badges are listed on the info pages of certain tools on the MakeHaven website. Any listed badge is required by default unless explicitly noted otherwise. Badges can only be issued by Community Animators (identified volunteers) and MakeHaven staff. The badge is not a certification or guarantee of proper instruction of use, only an orientation to the configuration and use of the tool at MakeHaven. Badges may have different requirements listed, including but not limited to watching a video, taking a knowledge quiz, demonstrating proficiency or attending a class. Members should never use a tool which they are not certain they are able to use, and have gone through the appropriate badging session. Starting with the move to 770 Chapel access control for many tools will be migrated to a digital system which tracks a members badging history and regulates access. It is impossible to regulate all tools in this manner, so the honor system is employed in some cases. It is considered a grave offense to use any tool without first doing the appropriate badging
- **Buddy Tools** - These tools require two members to be in the shop to be used. In no case will a member use these tools without an identified and informed individual within earshot who can respond in an emergency. Any tools with large exposed blades capable of unintentionally removing a hand or exposed rotating parts with enough torque to pull a user into the machine is automatically a buddy tool. Buddy tools include: Table saw, circular saw, chop saw, lathe, panel saw, and similar. Tool pages on the website also identify which are buddy tools. If you have any question if some tool should be a buddy tool, err on the side of treating it as a buddy tool.
- **Optional or Non-Badged Tools** - Some small tools such as the soldering iron have no badge or an optional skill badge which recognizes time taken to learn an additional skill and use the equipment properly, but is not a requirement for basic use. If a tool explicitly notes the badge as optional the member may use the tool without going through the badging process if they have sufficient experience so that they can answer affirmatively to the Tool Use Safety Statement.

Note: some tools may have their own policies and procedures that any member using them must abide. For example the metal CNC has its own set of sub policies.

Tool Usage Statement

A responsibility of membership is for each member, before using any tool, regardless of previous use or experience to go through the mental checklist of if their tool use is: informed, safe, responsible, confident. Members agree to periodically review the following statement and refrain from tool use if they can not attest to all of the contained statements.

Tool Use Safety Statement

I attest that I will be informed, safe, responsible and confident in using a tool or will refrain operating it. I will follow these rules and check for and abide by updates to this policy as posted on the MakeHaven website. In order to use any equipment I will be:

Informed: Watch the safety video or videos related to the machines which require a badge as identified on the website. Reviewed, understand and accept the membership, shop rules and will abide by all signage. Am aware of risks associated with the tools and will protect the safety of myself and others in the shop. Understand that MakeHaven's badged equipment is for badged members only.

Safe: Will not use dangerous machines alone. I will use appropriate safety gear and appropriate attire (including managing long hair). Will never use a machine under the influence of alcohol or drugs.

Responsible: Will Inspect machine for safety, defects or other problems prior to use. If I break or find something broken on a machine I will report it to Info@makehaven.org and leave a note on the machine to inform others. I have valid medical insurance. I will clean up after every work episode.

Confident: Have familiarized myself with any machine I use and feel confident in my abilities and secure that I can safely operate the machine.

A user of a tool must always be sure they are: informed, safe, responsible and confident to use a MakeHaven tool, absolutely no tool or machine usage otherwise. All safety rules and signs need to be observed 100% of the time. Failure to do so will result in suspension/revocation of membership.

MakeHaven Safety Assets

- All Community Animators (volunteer coordinators) and staff will be offered a first aid class annually. We encourage members to have up to date first aid training.
- First aid kits will be stored on location, eye wash station is mounted on wall. Take note of locations.
- Medical resuscitation device will be stored on location. Take note of its location.
- A labeled emergency call button will be located in metal shop and woodshop to facilitate 911 calls. Take note of its location.
- Eye, ear and dust protection equipment is made available. Take note of its location.
- There is a pull fire alarm. Take note of its location.