

INT112 LAB 1.1: MACHINE SHOP

INTRODUCTION

Student Name: _____

Student ID: _____

LAB OUTCOMES:

Upon completion of this lab procedure, the student should be able to:

1. Locate the various safety equipment found in the shop lab.
2. Demonstrate use of the emergency stop buttons.
3. Identify various machine tools in the shop lab.
4. Power on various machine tools safely.
5. Demonstrate basic machine movement, without tooling or material.
6. Identify how to set the spindle speeds on a lathe, mill, and drill press.

LAB PROCESS:

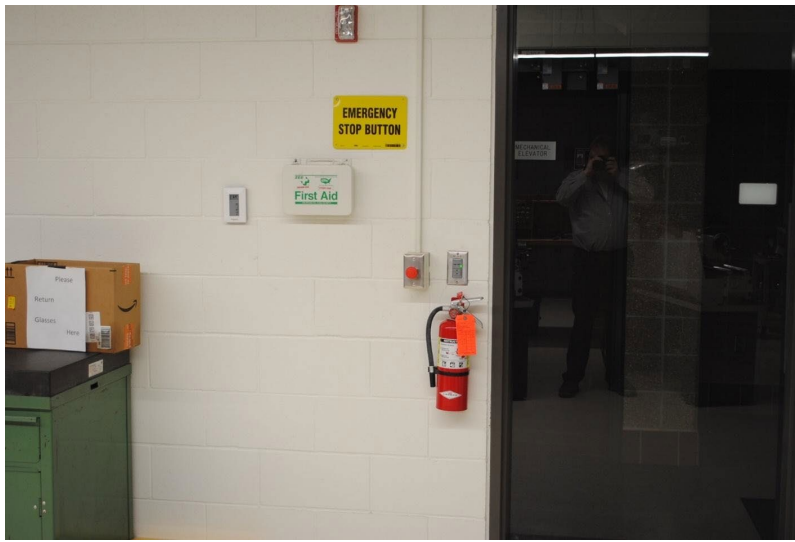
Before entering the machine shop, ensure that you have observed all required safety procedures:

- Safety glasses on
- Closed-toed shoes
- No rings or other jewelry
- No loose-fitting clothing
- Long hair pulled back
- Not under the influence of any substance that dulls reaction time or judgement

Part 1

The NSCC machine shop is split between rooms E100 and E108. For this lab, you should plan to enter through E100.

1. Locate fire extinguishers on the walls. There are two in E100 and two in E108.



What class of fire extinguisher are these? _____

What types of fires can this extinguisher be used on?

What types of fires should this extinguisher NOT be used on?

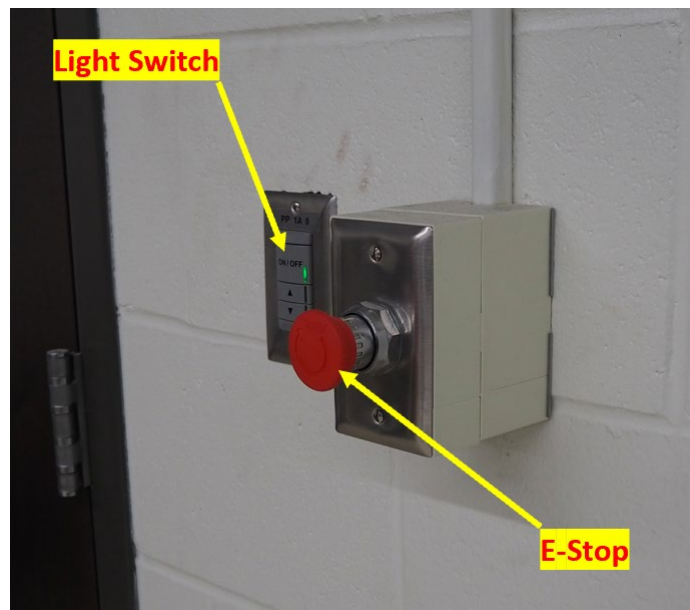
2. In the event of fire, there are also fire alarm pulls located in the lab. Where are these?
3. Locate the first aid kits located in both E110 and E108. These are for small cuts, scrapes, or burns. Where are these?

4. In the event of a more severe accident or injury, you may need to call Campus Security for assistance. You can reach them by dialing 3 from any campus phone. Where is a phone?

5. In the event of severe injury, where you need to call 911 for assistance, you should provide emergency responders with the closest door. All external doors at NSCC are numbered. What is the closest external door to the machine shop?

Part 2

Locate the machine shop emergency stop buttons. There are four on the walls in the machine shop, two in E100 and two in E108. Pressing these will cut power to the machine shop. Only the instructor can reset the circuit breaker that is tripped when the emergency stop button is pushed.



Where are each of these buttons?

Part 3

1. Locate a Solberga vertical drill press in the machine shop.
Where are these machines?

Locate the emergency stop button on the drill press.

Look at the machine settings. What is the initial drill speed?

Make sure that there is no drill bit in the chuck, then start the drill.

Move the drill head up and down with the manual lever.

Stop the drill.

Adjust the drill speed up or down to see how the RPM of the drill is adjusted. What is the new drill speed?

Start the drill. Do you notice the difference in speeds?

Stop the drill.

Instructor verification _____

2. Locate a pedestal grinder in the machine shop.
Where are these machines?

The pedestal grinder does not have an emergency stop button. What emergency stop controls these machines?



Figure 1: Vertical drill press in the machine shop



Figure 2: Pedestal grinder in the machine shop

Make sure that the grinding wheel can turn freely.

Start the pedestal grinder.

Stop the grinder.

Instructor verification _____

3. Locate the surface grinders in the machine shop.
Where are these machines?

The surface grinders do not have an emergency stop button.
What emergency stop controls these machines?

Make sure that nothing is touching the grinding wheel.

Start the surface grinder.

Stop the surface grinder.

Instructor verification _____

4. Locate the horizontal band saw.
Where is this machine?

Locate the emergency stop button on the horizontal band saw.

Lift the cutting saw up and off the worksurface.



Figure 3: Harig surface grinder (top) and K.O. Lee surface grinder (bottom)



Figure 4: Horizontal band saw

Start the saw.

Stop the saw.

Instructor verification _____

5. Locate the vertical band saw.
Where is this machine?

Locate the emergency stop button on the vertical band saw.

Make sure that the cutting saw is up and off the worksurface.

Start the saw.

Stop the saw.

Instructor verification _____

6. Locate the manual lathes. The NSCC machine shop has two varieties – Willis and Enco.
Where are these machines?

Locate the emergency stop button on both a Willis and Enco lathe.

Make sure there is no workpiece in the lathe. If a chuck is installed in the spindle, make sure the chuck key is removed.

Look at the machine settings. What is the initial spindle speed?

Start the lathe.

Stop the lathe.



Figure 5: Vertical band saw



Figure 6: Lathes in the machine shop

Adjust the spindle speed up or down to see how the RPM is affected. What is the new spindle speed?

Start the lathe. Are you able to notice the difference in speed?

Stop the lathe.

Movement in a three dimensional space can be defined by three axis – X, Y, and Z. With a machine tool, the Z axis refers to the direction of the spindle. For a lathe, this means that the X axis is towards/away from you, and the Y axis is up/down.

Move the carriage in the specified direction. Your instructor will provide the values. These may be positive or negative.

X axis: _____ inches

Z axis: _____ inches

Instructor verification _____

7. Locate the manual milling machines. The NSCC machine shop has Microcut and Trak mills. Where are these machines?

Locate the emergency stop button on both a Microcut and Trak mill.

Make sure that there isn't a cutting tool in the chuck.

Look at the machine settings. What is the initial spindle speed?

Start the mill.



Figure 7: Milling machine

Adjust the speed of the spindle up or down. What is the new spindle speed? Are you able to notice the difference in speeds?

Stop the mill.

Again, when referring to a machine tool, the Z-axis is always in the direction of the spindle. For a vertical milling machine, this makes the X axis is left/right, and the Y axis is towards/away from you. Move the bed in the specified direction. Your instructor will provide the values. These may be positive or negative.

X axis: _____ inches

Y axis: _____ inches

Z axis: _____ inches

Instructor verification _____

Questions

1. What is the difference between the machine shop emergency stop buttons on the walls and the machine emergency stop buttons?
2. Provide an example of when you may need to use a machine's emergency stop button.
3. Provide an example of when you may need to use the machine shop emergency stop button.

The outcomes of this exercise (listed on page 1) specifies the skills that the Student must demonstrate to the Instructor. Once the Instructor is satisfied with the demonstration of Knowledge & Skills by the individual student, they will sign this document (for the student), then enter a 100% into the Hands-On Lab grade in Sakai.

I verify that this student has completed all of the requirements of this Hands-On Assessment:

Student Name: _____

Faculty Signature: _____ Date: _____

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