**Example Standard Operating Procedure**

**Title:** SOP-001 Milling Machine

**PI:** Art Erdman  
**Lab Location:** Mayo G217

**Issue Date:** 11/11/13  
**Revision Date:** NA

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**Approved by:**

**Hazard Identification:**

Physical Danger

**Exposure Assessment:**

**Motions**
- Rotating Motion
  
  In milling machine operation, the spindle, and subsequently the arbor and endmill or drill bit are sources of rotating motion. Rotating elements could grip loose clothing, gloves, hair, or appendages which could result in severe injury. Rotating elements can also propel poorly secured items across a room.

- In-Running Nip Points
  
  The belt assembly above the cutting area is a source of in-running nip points. Clothing, hair, or appendages could get caught and pinched in these points resulting in severe injury.

**Actions**
- Cutting
  
  The cutting action of the milling machine is performed by the endmill or drill bit when it rotates. The endmill and drill bit are sharp. The cutting action produces material chips that could be sharp. These chips may be propelled into the air by the rotating motion of the milling machine and cause injury.

**Control Plan:**
- Always know where the power off button is located in case of emergency
- Always disconnect the machine from the power source before making any repair, adjustment, or when installing or removing tooling
- Do not wear gloves, loose sleeves, jewelry, or unrestrained hair styles as they could get caught in the rotating elements of the machine
- Wear long hair in a bun so it is not caught in the rotating elements of the machine
• Wear safety glasses to protect the eyes from chips
• Always keep the belt assembly enclosed when running, to prevent in-running nip points from causing injury
• Always secure work to mill table. Never mill loose work. Never secure the work with hands
• Always check validate spindle speed with the endmill size and type of material before beginning the milling process
• Do not operate while under the influence of drugs or alcohol

**Experimental Procedures:**

• Put on all safety equipment and tie back loose hair or clothing before operating machine
• Check to make sure all parts of machine are working and functioning properly
• Double check all measurements for operating machine on work piece
• If spindle speed needs to be changed, (User Manual, p. 10-11)
  o Disconnect the machine from the power source
  o Loosen the motor mount lock lever, and pull motor toward head casting to release tension on the v-belts
  o Release belt cover latches and slide the pulley guard open
  o Arrange the v-belts on the pulleys for the desired spindle speed
    ▪ Look at the speed chart on the front face of the machine for the correct pulley and v-belt configuration
  o Push motor away from head casting and lock motor mount lock lever
Note: For best results, all milling operations should be done with the spindle as close to the head assembly as possible.
  o Lock spindle and table in place before operating
• Position work piece as desired and clamp to table
• Make sure all safety equipment is on correctly and put safety guards into position
• Start machine by pressing the on button
• Use machine to mill work piece as desired
• When finished, turn off milling machine right away
• Wait until spindle has completely stopped before unclamping work piece
• Clean machine after use and dispose of debris (see Waste Management Procedures)

For other inquiries, see MillingDrilling Manual.

**Waste Management Procedures:**

When finished with the milling machine, always clean the area. There should be no chips or filings on the work table or floor. Dustpan, handbroom, regular broom, paper towels and cleaning solution can be found in G217-09.

Place all endmills, drill bits, wrenches, arbors, clamps, raw materials, and vice grips back in the appropriate place.
Spill and Accident Procedures:

If an accident occurs, report immediately to the lab supervisor (G217-05) or other appropriate staff member. If no one is around, dial 911 on the landline phone near the door of G217-09 to reach the campus police. The lab first aid kit is located on the wall near the sink. A first aid pamphlet from DEHS is located in all of the MDC’s first aid kits.