UNC CHARLOTTE
Department of Engineering Technology

LABORATORY SAFETY ANALYSIS

OPERATING A VERTICAL KNEE MILL

Location: Smith 128A/B

Required Training: Mills are designed and intended for use by properly trained and experienced operators. If you are not familiar with the proper and safe operation of a mill, do not use until proper training and knowledge have been obtained.

Required Personal Protective Equipment (PPE): Safety glasses face shield in addition to safety glasses if stock material chips severely, closed toed shoes.

Reference Materials: Manufacturer's safety rules and operating instructions

PHOTOS	TASK	HAZARDS	CONTROLS
	Remove all jewelry. Wrap long hair in net. Ensure clothing is sturdy and snug. Loose clothing, gloves, neckties, rings, bracelets, or other jewelry may get caught in moving parts.	Caught in mill, struck by, lacerations, etc.	• Do not wear any jewelry that may get caught in the mill. • Do not wear gloves when operating a milling machine. • Loose clothing may get caught in moving parts.
	Wear clear safety glasses with side shields and if necessary use a dust mask.	Flying debris and dust particles	• Students are required to provide their own safety glasses. • See laboratory instructor or laboratory manager if you do not have safety glasses before proceeding to use equipment.
	Inspect safety glasses for cracks, scratches or other defects. Ensure the ANSI standard Z87.1 is stamped into the side of glasses. If necessary inspect leather gloves and face shield.	Flying debris and dust particles	• If defects are found report to your laboratory instructor before using.
	Put on all necessary PPE	Flying debris and dust particles	• Always wear safety glasses. Never wear gloves during operation of milling machine.
	Inspect work area, walk around area looking for debris and ensure adequate lighting.	Slips, trips & falls	• Remove any debris that could possible cause an injury. • Keep work space around milling machine free from scraps, oil and grease.
	Visually inspect the electrical power cord.	Electrical shock	• If the electrical cord is damaged or worn the electrical cord should be unplugged and

			tagged "Out of Service-Do Not Use". • This should be reported to the laboratory manager immediately. • Electrical cord replacement should only be conducted by a factory authorized technician.
	Ensure the electrical cord is connected to electrical outlet.	Electrical shock, injury	• Caution: Always remember to disconnect the electrical power cord before adjusting step pulley position.
	Visually inspect milling cutter.	Struck by, cut, injury	• When setting up to work, check the milling cutter. Make certain all loose hand tools, spindle wrenches, chuck keys, and measuring tools have been removed from the machine and put in the proper location.
	Visually inspect other adjustable parts.	Cut, injury	• Ensure that motor pulley is tight; ensure that down feed and power table feed are in the off position prior to turning the mill on. • Confirm that hi-lo speed selector knobs are properly set.
	Operating milling machine	Struck by flying debris, laceration, Injury	• Devote your individual attention to the work being performed. The chips produced in the milling process can be razor sharp. Always use a brush to clean a machine. Never reach into the area near a rotating cutter. • Calculate the proper spindle speed and table feed rate before beginning a cut. • Make certain to use a proper safety factor for rigidity of the set up and condition of the tooling. • Make certain that the feed direction being used does not result in a climb milling operation.
	Make certain that the work piece is securely fixed and that all components of the fixture are securely fastened to the table.	Strain, struck by	• Use the proper lifting techniques, ask for assistance or obtain a mechanical lifting device. • Pay extra attention to the position and angle of toe clamps. • Turn on mill by switching the button to the "ON" position
	Check the direction of the milling cutter.	Burns	• Ensure that the milling cutter is rotating in the proper direction before beginning a cut; otherwise the milling cutter will burn up or possibly shatter.
	Apply all coolants to the tool bit in a safe manner.	Slip hazards	• The use of spray bottles or drop type applicators is highly recommended. Oil and grease spills are extreme slip hazards. Clean any spills at once.
	Turn the milling machine on by switching the button to the "ON" position and proceed with table and/or quill movements.	Cut	• Make certain that the milling cutter, its tool holder, and the spindle, are free of the work piece and will not run into any of the fixture components. • Guards should be in place and used at all times. • Intermittently clean chip accumulation with

			brush or vacuum, never with air hose.
	Turn off milling machine by switching the button to "OFF" position.	Struck by flying debris, laceration, Injury	• Always turn the power off and wait to the milling cutter stops. • Use the milling machine spindle brake to stop the spindle after the power has been turned off.
	Remove stock material	Cut	• After the power is turned off, wait until the milling cutter stops. Never stop the cutter by allowing it to cut into any material. Caution: machined stock may have sharp edges.
	Clean work area and return all PPE to clean, dry storage area.	Injury	• To ensure adequate housekeeping measures to prevent accidents.

For more information about this LSA, contact the *Department of Engineering Technology* at UNC Charlotte (704) 687-2305

Please visit our website at: http://www.et.uncc.edu\

The development of Laboratory Safety Analyses is a very effective means of helping reduce incidents, accidents, and injuries in the workplace. It is an excellent tool to use for training purposes and can also be used to investigate "near misses" and accidents.