

GRINDING THE ENDS OF CONCRETE CYLINDERS AND CORES

1. PROCEDURE OVERVIEW

This procedure provides instructions for how to prepare concrete cylinders and cores for testing (compressive strength, modulus of elasticity, and splitting tensile strength) using the end grinding machine located in the south end of FSEL. The procedure has been used for concrete compressive strengths as low as 2,000 psi. Grinding concrete with less strength may result in damage to the samples.

1.1. Student Responsibilities:

- Read and understand the requirements of this procedure
- Provide concrete samples for grinding
- Clean-up of the machine after use

1.2. Staff Responsibilities:

- Read and understand the requirements of this procedure
- Assist students as needed
- Replace the grinding wheel when necessary

2. EQUIPMENT AND TOOLS

- Concrete Cylinder End Grinding Machine
- 7/8 in. Wrench

3. MATERIALS

- Concrete Samples (Cylinders, Cores, or Both)

4. PERSONAL PROTECTIVE EQUIPMENT

- Safety glasses
- Safety Shoes
- Gloves

5. DETAILED PROCEDURE

5.1. Prepare the end grinder for use

Many of the processes described within Section 5.1 should have been performed after the previous user completed his or her use. Failure to clean the machine after use by a previous user does not excuse the current user from responsibility to clean the machine after his or her use.

GRINDING THE ENDS OF CONCRETE CYLINDERS AND CORES

- 5.1.1. Locate and remove the water pump from the water reservoir.

The pump can be found by following the power cord and water line. Once located remove the pump from the reservoir and set it aside in a safe place. The pump may be buried and submerged in concrete grit if the grinding machine was not cleaned by a previous user.

- 5.1.2. Empty the residual concrete dust and debris from the water reservoir.

Roll the cart containing the reservoir out of the south end of the lab and dump the contents in the southeast bone yard. The reservoir should be dumped onto the area where concrete trucks wash out after delivery. This area is west of the concrete slab on the northwest side of Building 46.

- 5.1.3. Refill and return the reservoir to the end grinding machine.

Fill the blue reservoir approximately halfway with fresh water. There is a spigot and water hose in the southeast corner of Room 174 (where the end grinder is located).

Adding some liquid soap to the cutting water helps lubricate the grinding wheel and cutting surface of the sample. It also makes it easier to clean up.

- 5.1.4. Clean then return the submersible pump to the reservoir.

If the pump has been submerged in wet concrete cuttings, the impeller may be clogged. To check for a clog, unplug the electrical connection to the pump from the back of the end grinding machine and plug it into an ordinary wall outlet. The pump should begin spinning immediately. If it does not, unplug the pump gently clean the dust from the impeller and water intake. Once the impeller is spinning normally, return the electrical connection to the back of the end grinding machine and place the pump in the reservoir.

- 5.2. Insert the concrete samples into the carousel.

- 5.2.1. Identify which diameter (4 in. or 6 in.) of cylinders or cores is to be ground.

- 5.2.2. Ensure the proper cylinder carousel is installed in the machine.

The end grinder can grind 4 in. or 6 in. diameter samples. However, the carousel must be changed to accommodate the appropriate size. The typical sample size within FSEL is 4 in. If the cylinder carousel needs to be changed to accommodate a 6 in. sample, consult an FSEL staff member for assistance.

GRINDING THE ENDS OF CONCRETE CYLINDERS AND CORES

- 5.2.3. Lift the lid to the grinding compartment.

For safety, ensure that the machine is in "OFF" mode, but pressing the red button, so that power cannot accidentally be turned on when the lid is open.

- 5.2.4. Install samples by sliding one sample into the top station and making sure to push the sample all the way to the back stop.

- 5.2.5. Lock the sample into place with the cam using 7/8 in. wrench.

Torque sample with approximately 20-30ft-lbs. on hex cam bolt, (which creates a clamping force of 500 lbs. on the sample). It is extremely important that the cylinders be securely locked in the carousel. Any movement will affect the final plainness of the samples. After finally securing the locking nut, give the wrench a final tap with your hand or small rubber mallet.

Do not leave samples clamped into carousel while not in use, as it creates flat spots on the urethane clamping sleeves.

- 5.2.6. Rotate the carousel by hand to load additional cylinders or cores.

To load additional samples repeat the Articles 5.2.4 and 5.2.5 as needed. Distribute the samples around the carousel to maintain balance when the carousel rotates.

- 5.2.7. Gently close the lid to the grinding compartment.

- 5.3. Grind the ends of the samples.

- 5.3.1. Turn the machine on by pressing the green "Power On" button.

It may also be necessary to twist the red "Off" button slightly to release it.

- 5.3.2. Confirm the feed switch is set to "low."

- 5.3.3. Start the grinding process.

*Press the yellow "Start" button to begin grinding. Once the grinding cycle has started, the yellow button should be illuminated. The machine will automatically process the ends of the cylinders or cores and stop at end of cycle. The cycle is completed when the yellow light is off and the grinding head has returned to its "home" position. After the motors have switched off, you can open the lid. **DO NOT OPEN THE LID UNTIL THE YELLOW LIGHT TURNS OFF.***

GRINDING THE ENDS OF CONCRETE CYLINDERS AND CORES

- 5.3.4. During grinding, check that the water pump is cycling water through the grinding compartment.

After the grinding cycle has started, ensure that water is flowing out of the tube from the lower portion of the grinding compartment into the reservoir. If water is not flowing, check the pump and its impeller per the recommendations of Article 5.1.4. If the water is not flowing after checking the pump consult an FSEL staff member.

- 5.3.5. After the grinding cycle is complete and the yellow light has turned off, open the lid and remove the samples from the carousel.

- 5.3.6. Inspect the ground end of each cylinder or core.

If the freshly ground end does not have aggregate that is uniformly visible over the entire surface, the grinding cycle may need to be repeated on that end. If so, go back to Article 5.2.4 and repeat the necessary steps.

- 5.3.7. Grind the opposite end of the cylinder or core.

Repeat Articles 5.2 and 5.3 as needed to grind the opposite end of the samples.

- 5.4. Clean the end grinding machine.

- 5.4.1. Using a water hose, rinse the grinding dust and debris from the grinding compartment into the reservoir.

It is important to clean the machine after each use, as deposits will build up inside the grinding wheel, enclosure, and lid. The wheel will build up deposits and cause vibration due to imbalance if not properly cleaned.

- 5.4.2. Gently close the lid to the grinding compartment.

- 5.4.3. Locate and remove the pump from the water reservoir.

The pump can be found by following the power cord. Once located remove the pump from the reservoir and set it aside in a safe place.

- 5.4.4. Empty the residual concrete dust and debris from the water reservoir.

Roll the cart containing the reservoir out of the south end of the lab and dump the contents in the southeast bone yard. The reservoir should be dumped into the area where concrete trucks wash out after delivery. This area is west of the concrete slab on the northwest side of Building 46.

**GRINDING THE ENDS OF CONCRETE
CYLINDERS AND CORES**

5.4.5. Return the reservoir to the end grinding machine.

If the end grinding machine is not going to be used in the near future, the reservoir can be left empty for the next user.

5.4.6. Replace the submersible pump in the reservoir.

5.5. Turn off the end grinding machine by pressing the red stop button.

6. SUPPORTING DOCUMENTS

None.

7. REFERENCED DOCUMENTS

7.1. Manual – Installation and Operation of the Diam-End Grinder; September 2013.

8. RECORD OF REVISIONS

Revision	Date	Affected Pages	Description
0	2016-10-21	All	Initial Issue