PCI Plant Quality Talk
Quality Enhancement Committee

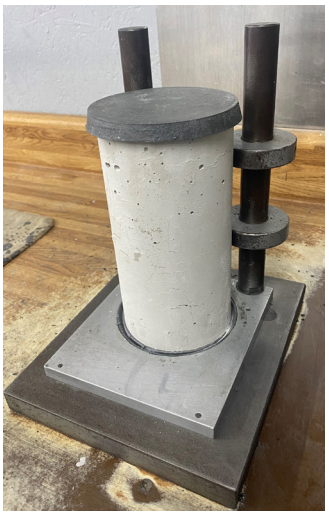
SERIES 3, ISSUE 5 – CAPPING OF CYLINDERS

To help ensure that the results of compressive strength tests accurately reflect the strength of the specimens, of the specimen, the ends of the cylinders must be plane, level, and perpendicular to the cylinder side. Unless the specimen ends are cast or ground to within 0.002 in. (0.05 mm) of a plane surface, the specimen ends will need to be capped.

There are two approved methods to cap a cylinder provided in ASTM C39/C39M, *Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens*. In the first method, neoprene pads that sit inside a steel retainer are placed on both ends of the cylinder before testing. This neoprene pad system is referred to as an unbonded system and must conform to ASTM C1231/C1231M, *Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders*.

The second method covers the ends of the cylinder with a capping material that conforms to ASTM C617/C617M, *Standard Practice for Capping Cylindrical Concrete Specimens*. This capping method is referred to as a bonded capping system because the capping materials adhere to the ends of the cylinder and result in smooth and parallel cylinder ends. The most common material used in precast concrete operations is sulfur mortar due to its rate of strength gain.





	NEOPRENE PADS	SULFUR MORTAR CAPPING
Pros	• Relatively inexpensive • Quick and easy to test cylinders • Cylinders need minimal preparation to be tested	• Covers a large range of compressive strengths • Fracture patterns from cylinders are typically consistent • Compression results are typically more consistent
Cons	• Requires different pad durometers (50, 60, and/or 70) for different compressive strengths • Only covers concrete compressive strength between 1500 and 7000 psi without qualification testing, or up to 12,000 psi with qualification testing • Usage of pads must be tracked • Requires greater attention to finishing specimen ends and placing fresh cylinders on a level surface for initial curing	• Handling of molten sulfur mortar requires special safety precautions • Hydrogen sulfide gas may be produced while capping; proper ventilation is required • A cap-curing period before compressive strength testing (2-16 hours) is recommended • Initial investment in equipment can be expensive • Periodic cube strength tests are required

Best Practices

- The individual performing compressive strength tests should be a qualified technician.
- Ensuring cylinder molds are clean and watertight helps ensure compression tests have an accurate representation of the sampled batch.
- Proper preparation is needed to ensure the ends of the concrete cylinders/cores are smooth and the load bearing surfaces are parallel, as specified in ASTM C39/C39M, *Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens*.

PCI Plant Quality Talk
Quality Enhancement Committee

Note: Please complete this form and return to the Quality Control Manager. All crew members should be observant and report to their foreman anything out of the ordinary on a project. See something, say something.

NOTES	ATTENDEE SIGNATURES
_____ DATE _____ PRESENTER	_____ _____ _____ _____ _____ _____