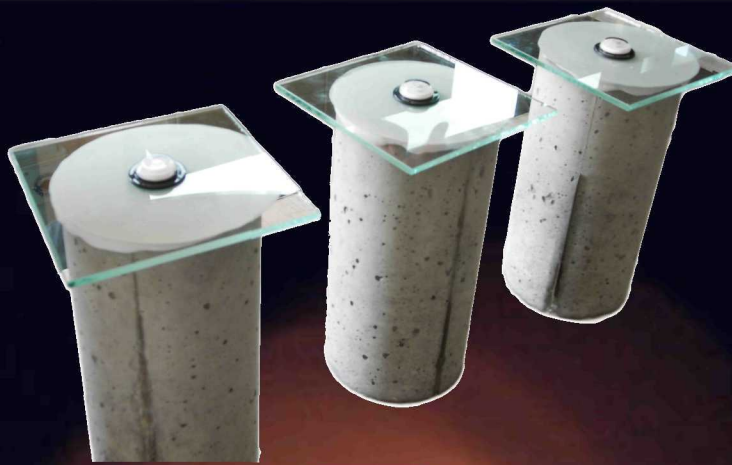


Capping Materials Comparison



GYPSUM CAPPING



SULFUR CAPPING



NEOPRENE PADS





Abstract :

Currently there are three capping methods for concrete compress strength testing: sulfur capping, high strength gypsum capping, and neoprene pad non-bounded capping. Below we compare:

1. Test data accuracy. 2. Operation convenience. 3. Hardening time.

After 3 times repeated testing for the 3 capping methods, we found that Gypsum has several prominent advantages over the other methods.

- Providing the best pressure uniformity and data accuracy
- Simple, non-toxic operation. Human-friendly.
- Short hardening time and rapid sample preparation

* All the experiment were done in KNC (KANJANA CONCRETE), Thailand

Capping process :

	Material	Operation Temp.	Hardening Time	Operation Range
Gypsum Capping	High Strength Gypsum	Room Temp.	30 mins	0 ~ 9000 psi
Sulfur Capping	Pure Sulfur	~ 140 °C	120 mins	0 ~ 3000 psi
Neoprene Pad	Neoprene Pad	Room Temp.	NA	0 ~ 9000 psi

•Gypsum capping:



- **Sulfur capping:**



- **Neoprene pad capping:**

* Use new Neoprene pad for the test to eliminate variation



New PAD for the test



~50 Time used



Test Sample :

Target compressive strength for concrete cylinder sample: 400 kgf/cm²



Conclusion :

As the data shows, Gypsum capping creates a superior capping surface with complete flatness perpendicularity and horizontality. Therefore, it can reach the highest compressive strength value and retain stable data anytime. From the operational point of view, Gypsum only needs water to react. It provides a non-toxic, human-friendly environment and also significantly increases the efficiency of sample preparation.

Sulfur Capping is a similar capping material to gypsum, however, it takes a long time to harden. It is foul smelling and toxic.

Neoprene Pads have a lower compressive strength and higher SD value because of the incomplete perpendicularity and horizontality. Furthermore, the neoprene pad test results have higher and higher variation as the used times increase. It is seemingly convenient but quite an inaccurate capping material.



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ชื่อลูกค้า - สถานที่	ตัวอย่าง	ก่อนบันทึก	ค่าปริมาตร (cm.)	วันที่ทดสอบ	อายุ (วัน)	น้ำหนักก้อน (kg.)	กำลังอัดเฉลี่ย (KG)	ค่าเฉลี่ย (KSC)	โรงงานที่จัดส่ง	หมายเหตุ
หัวรถ	A1	S475				13.4	246			380 = 80%
	A2	#				13.1	336			400 φ
	A3	#				13.2	377			
หัว กิ่ง	B1	S475				13.3	400			382 = 96%
	B2	#				13.4	395			400 φ
	B3	#				13.4	351			
	C1	S475				13.3	393			411 = 103%
	C2	#				13.3	430			400 φ
	C3	#				13.3	410			

1. Test Data Record From KNC:

- Theoretically compressive strength
400 kgf/cm²

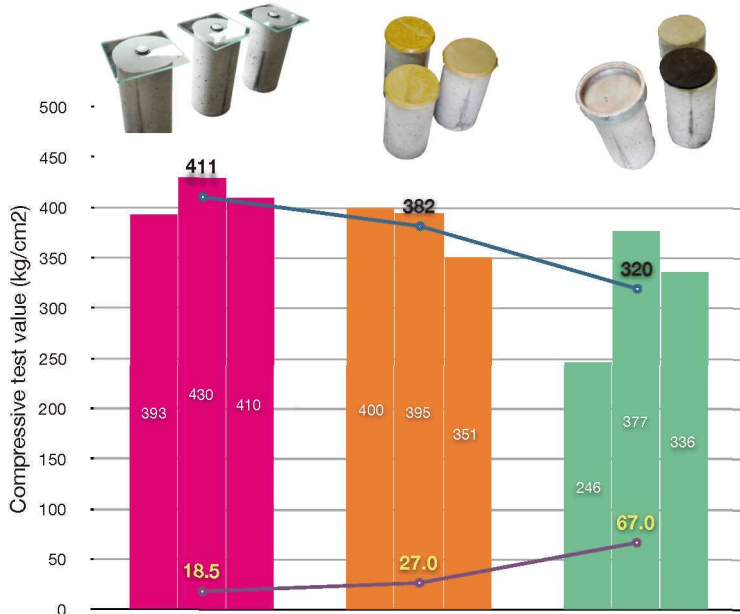
- Relative percentage for the test result

Gypsum capping (103 %)

Sulfur capping (96 %)

Neoprene Pads (80 %)

*Gypsum capping has the highest value because the complete flatness perpendicularity and horizontality.



2. Bar Chart for the test result:

- Average

Gypsum capping (411 kgf/cm²)

Sulfur capping (382 kgf/cm²)

Neoprene Pads (320 kgf/cm²)

- Standard Deviation

Gypsum capping (18.5)

Sulfur capping (27.0)

Neoprene Pads (67.0)

3. Six Sigma analysis:

- Gypsum capping shows the highest average value and smaller deviation.

- The test result for Sulfur capping is slightly worse than Gypsum capping.

- Neoprene Pads have lower compressive strength and higher SD value because of the incomplete perpendicularity and horizontality.