

Satja Muangnok 2008: Effect of Specimen Shape and Size on Compressive Strength of High-Strength Concrete. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Associate Professor Trakool Aramraks, Ph.D. 62 pages.

High-strength concrete is currently a common construction material and its compressive strength is the most basic and important material property in structural design. However, it needs to be consistent in using this value because the control specimen sizes and shapes may be different and the conversion factors for concrete having compressive strength higher than 500 kg/cm^2 are not available in the current standard of practice published by the Engineering Institute of Thailand. In this study, the influences of specimen size and shape on compressive strength of high-strength concrete are investigated using four different specimen types i.e. cube 100 mm, cube 150 mm, cylinder $\text{Ø}100 \times 200$ mm and cylinder $\text{Ø}150 \times 300$ mm. A total of 288 specimens were cast from four different concrete mixes having design compressive strength (standard cylindrical strength) of 550, 700, 850 and 1000 kg/cm^2 .

After testing of specimens at 7 and 28 days, the results show that the cube specimen is generally stronger than the cylinder specimen and this effect will be gradually decreased when the concrete strength increased. The ratio of the compressive strength at 28 days of $\text{Ø}150 \times 300$ mm cylinder to the 150 mm cube is varied from 0.78 to 0.86 for the designed cylinder compressive strength of 550 to $1,000 \text{ kg/cm}^2$. For the effect of specimen size, the results show that compressive strength increases as the specimen size decreases. From the 28-days test results, the ratio of 150 mm to 100 mm cube strength and $\text{Ø}150 \times 300$ mm to $\text{Ø}100 \times 200$ mm cylinder strength are 0.96 and 0.97, respectively. This size effect might be ignored as the relationships showed that the effect is relatively small compared to specimen shape effect.


Student's signature

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Thesis Advisor's signature