CVEN 3400 – Structural Testing Laboratory  
Lab 6: Admixtures fly ash, retarders, accelerator, revert Laboratory Assignment

Lab Report (submit this problem set as you would using the TSU Engineering Format)

# Refer to the reference source for information on Admixtures  
(http://www.ecoccs.com/Admixtures.pdf)

*1) In complete sentences, state five types of admixtures and discuss their applications.

*2) If you were a materials engineer in Minnesota (cold climate) and could only use one type of admixture, which would you select? Explain.

3) If you were a materials engineer in Arizona (hot and dry climate) and could only use one type of admixture, which would you select? Explain.

*4) Under what condition(s) is an air entraining agent needed? Why? Discuss how the air entraining agent performs its function.

*5) Why is a plasticizer used? How does it perform its function?

*6) A materials engineer is working in a research project to evaluate the effect of one type of admixture on the compressive strength of concrete. She tested 10 mortar cubes made without admixture and 10 others with admixture after 28 days of curing.

The compressive strengths of cubes in MPa without admixture were 25.1 MPa, 24.4 MPa, 25.8 MPa, 25.2 MPa, 23.9 MPa, 24.7 MPa, 24.3 MPa, 26.0 MPa, 23.8 MPa, and 24.6 Mpa.

The compressive strengths of cubes with admixtures were 25.3 MPa, 26.8 MPa, 26.5 MPa, 24.5 MPa, 27.2 MPa, 24.8 MPa, 24.1 MPa, 25.9 MPa, 25.3 MPa, and 25.0 Mpa.

a) Produce a bar plot of the compressive cube strength in MPa both with and without the admixture(s).

b) What is the mean, standard deviation, and variance of each set of 10 mortar cubes?

*7) “Hydraulic binders include lime pozzolana cements, hydraulic lime, Portland cement, Portland pozzolana cements and mixtures of lime and Portland cement. A hydraulic binder can harden with humidity even under water, but it must contain an acid substance. The most suitable are silicon dioxide and aluminum silicates, which are plentiful in clay. Argillaceous ingredients such as pulverized brick as well as silicium rich substances such as fossil meal and volcanic earth can be used, as well as waste ash from silica plants.”

a) The hardening reaction that you will balance follows:

$\text{(CaO} \times \text{SiO}_2) + \text{H}_2\text{O} \rightarrow \text{CaO} \times \text{SiO}_2 \times \text{H}_2\text{O} + \text{CaOH}$
b) If you have 40 moles of \((\text{CaO} \times \text{SiO}_2)\), then how much \(\text{CaO} \times \text{SiO}_2 \times \text{H}_2\text{O}\) is produced?


Refer to the Class Syllabus for information on how to properly cite references and display tables and figures.

# Source of Admixtures information