EYH STEM Career Day for Young Women 2016

Saturday January 30, 2016 approximately 25 middle school and 25 high school girls attended the "I ♥ Concrete Workshop" as part the 2016 Expanding Your Horizons STEM Career Day for Young Women. The concrete workshop was proposed, developed, and executed by the Penn State Cementitious Materials Research Group. This workshop familiarized students with the basic material properties of concrete, how concrete is used in the field, why studying concrete is significant, and encouraged women to enter a STEM- based field: civil engineering!

A brief interactive presentation discussed the main technical areas contained in civil engineering and how concrete can be utilized in all of these areas. The students learned how prominent concrete is in our society today (it is the 2nd most used material in the world!). They also learned that concrete is a mixture of air, cement, water, sand, and gravel. The volunteers brought these different components so the girls could make their own cementitious mixture. It should be mentioned that the gravel brought to the workshop was actually fake and made of chocolate for the girls to eat - yum!

The students were able to have a hands-on experience by mixing white cement powder, sand, and water to create necklace and key chain charms. As the students learned, the mixture would not harden in time to decorate, so they were provided with premade charms to decorate (the CMRG prepared them prior to the workshop).

The students were able to take home a beautiful final product so they can recall how cementitious materials are made.

For the high school girls, even more exciting fundamental concrete concepts were learned. Premade hardened concrete discs were given to each of the girls and they were told to drop them from different heights at the same time. As the girls observed, not all of the discs broke at the same time, but why? The high school girls were then informed that some of the discs contained special fibers that enhanced the concrete's resistance to cracking.

The high school girls also received a bonus activity during mixing to learn about workability. While mixing, half of the students were instructed to add 3 mL of water to their mixture while the other half was instructed to add 1 mL of a water-reducing admixture. The girls observed that adding 1 mL of water-reducing admixture significantly increased the smoothness of mixing (workability) much more than 3 mL of just water even though a greater volume of water was added.

Throughout the workshop the students were informed about different concrete practices in the field. Most importantly, all of the girls remained engaged, smiling, and interactive. The biggest accomplishment was witnessing the young women show interest and comfort during a workshop developed from the fundamental principles of a specific engineering topic.

I ♥ Concrete