INSTRON
The difference is measurable

TechNotes

Getting the most up-to-date information on materials testing

Instron.com | Subscriptions | Newsletter Archive | Testing Solutions | Contact Us

Issue 31

In This Issue

Application Article

Materials Science for Young Minds

Schuyler Patton, a teacher at Central High School, Philadelphia, PA, has a passion for materials science. He spent six weeks at University of Pennsylvania working with three professors to develop a senior materials science elective course – the very first materials science course at Central High School.

As the second oldest public high school in the USA, Central offers a curriculum aimed at students with a high grade point average and even higher career aspirations. Using an Instron 5565, Patton's students perform a range of analysis from standard stress-strain testing to comparative studies of different materials.

"This class is very similar to an introductory college class," Patton said. "It's focused on my students becoming familiar with different properties – elasticity, toughness, and strength, as well as the stress-strain curve and what it means. And the students are enjoying this class. We're doing a fun project to see who in the class has the strongest hair."

Not all the materials testing lessons are done during class time. Patton has set up independent research opportunities for students ranging from freshmen to seniors. Through compression testing, one freshman is researching methods to make concrete stronger, while a senior biology class is performing tensile tests with cow ligaments at various temperatures with different treatments to compare them with synthetic fibers. Additionally, a few groups analyzed possibilities of synthetic replacement materials for cow ligaments.

"This collaboration with Central High School is an exciting opportunity for us to build solid engineering principles into these special young minds," says Jim Ritchey, Director of Medical Markets.

Side tip: HVAC systems can cause transient conditions in your test machine as well. Make sure to keep your precision test machine away from hot/cold vents in order to minimize any transient effects!

Tech Tip

Testing at High or Low Temperatures

Testing at high or low temperatures can generate errors in your data if you begin testing before stabilizing the thermal conditions. When you first turn on your furnace or chamber, the load string is in a state of transition causing undesirable effects that can influence your results.

• Thermal expansion in the load string can cause compression loads and obscure fine extension data, as well as change the dimensions of the grips or pull rods.

• Even the highest quality load cells, which are thermally compensated so they can be used over a wide range of thermal conditions, only meet specifications once they are stabilized.

• During the transient stage, load cell drift could potentially affect test results.

It's important to remember to allow your load cells to reach a stable temperature and remain at this temperature to prevent drift. Just like preheating your oven before cooking, allow your load string and machine to warm up and stabilize before running tests – this will give you the most accurate test data.

* If you are interesting in attending a webinar on high-temperature testing, please let us know. Depending on the level of interest, the data and time will be emailed out at a later date.

You Asked – We Answered

Q: What is the difference between a single-point and a 4-point flexure test?

A: A single-point, or 3-point, bend test uses one loading anvil, whereas a 4-point bend test uses two loading anvils. The selection of an appropriate bend fixture depends on the material you're testing.

* Did You Know: A four-point conversion kit may be available for most standard three-point fixtures. Contact us for additional information.

	Type of Bend Test	
	3-Point	4-Point
Type of Material	Homogeneous (plastics)	Non-homogeneous (composites & wood)
Stress Concentration	Small and concentrated under the center loading point	Larger region to avoid premature failure
Specimen Deflection	Typically measured with the crosshead position	Typically measured with a deflectometer

Subscribe Today and receive the latest testing news

Tell us about your testing and you could win an iPod Nano!

View upcoming events where Instron will be attending

Submit your questions for future issues of TechNotes!

Instron Worldwide Headquarters
825 University Ave
Norwood, MA 02062
http://www.instron.com/