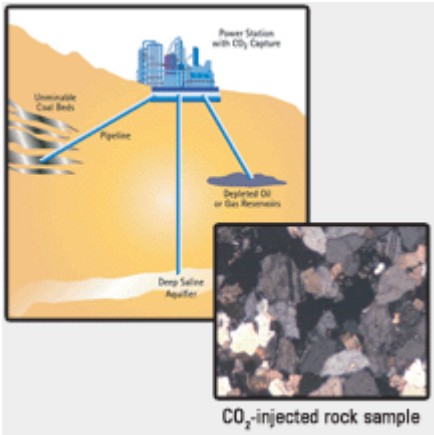
Instron® TechNotes Getting the most up-to-date information on materials testing

In This Issue

ISSUE 10

Application Story

From CO_2 to Solid Rock



Did you know that each day we pump 70 million tons of CO_2 into the Earth's atmosphere? Suzanne Hangx, M.Sc. of Utrecht University and her Dutch colleagues at CATO are using Instron equipment in their research to remove this greenhouse gas from the atmosphere. They are studying CO_2 Capture and Storage (CCS), a technology that may provide 100 years of CO_2 storage beneath the Earth's surface. So how does CCS work? Below the Earth's surface there is a vast volume of storage space available through unminable coal beds, depleted oil and gas reservoirs and aquifers. CO_2 is captured at power plants and pumped underground into these storage spaces. As the CO_2 spreads through the reservoir or aquifer it will partially dissolve into the present pore water, which results in the formation of an acid fluid. This fluid interacts with the porous rocks and causes the carbon to settle out through mineralization, resulting in a stable, solid rock.

In addition, there are several organizations around the world performing CCS research, ensuring it doesn't lead to undesirable sinking of the Earth's surface. In order to understand and quantify the effects of CCS, Hangx performed constrained compression tests on granular CO_2-injected rock samples using an Instron static testing system and a special compaction vessel

"Our results show that geomechanical processes, like grain cracking, are significantly inhibited in CO_2-injected samples and geochemical effects are negligible on short time scales. Our testing is proving that CCS is a viable and safe way to reduce greenhouse gas emissions," says Hangx.

Currently, there are a handful of CCS test sites around the world. With expanded implementation, CCS may allow precious time to work on improving energy efficiency and using renewable energy sources.

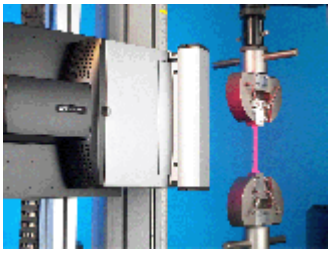
Tech Tip

When You Shouldn't Balance the Load Cell

We are often asked how many times and when an operator should balance the load cell during testing. It is most common for lab managers to create a test procedure that requires the operator to balance a load cell before the start of a new sample, but others insist on balancing the load cell before every specimen. We believe that either procedure is acceptable, as long as one rule is followed: never balance the load cell when there is a specimen in the grips. Instron load cells are very sensitive and can detect a change in load as a result of gripping the specimen. If the load is balanced after a specimen is gripped, you risk balancing a "real load". This real load will be subtracted from (or added to) reported results and can falsely increase or decrease actual values (depending on whether or not there was a compressive or tensile load on the specimen before the load cell was balanced). If you notice this change on the load channel display after gripping, operators have the option of using automated software features, such as preload or specimen protect (see the software help files for more information) or they can manually adjust the position of the crosshead.

You Asked - We Answered

Q: What style of extensometer do I need?



A: There are two main styles of extensometers – contacting and non-contacting. Contacting extensometers are widely used and provide accurate strain measurement. However, some applications (like biological tissue or thin film) demand a device that won't damage the specimen or affect test results. Non-contacting extensometers provide an ideal solution for delicate specimens, for specimens that break violently, for tests conducted in a chamber, and for specimens of varying lengths and elongations. An Instron Applications Engineer can recommend the correct instrument for your testing.

What do you think? Tell us!

INSTRON
Instron Corporate Headquarters
825 University Avenue
Norwood, MA 02062-2643 USA
http://www.instron.com/