

Hello and thank you for subscribing. This month, testing the re-use of waste glass in concrete plus measuring voltage and resistance.

You can download a pdf copy of this newsletter [here](#).



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### Reducing waste - Re-using glass in concrete

Web link: <https://www.windmill.co.uk/testing-concrete-stress.html>

As the use of glass products grows, so does the need for recycling. Glass is a unique inert substance that can be repeatedly recycled without altering its chemical properties. But recycling costs, impurities and mixed colours means that you can't recycle all the used glass into new glass products. How else then to provide an environmentally-friendly solution and avoid landfill?

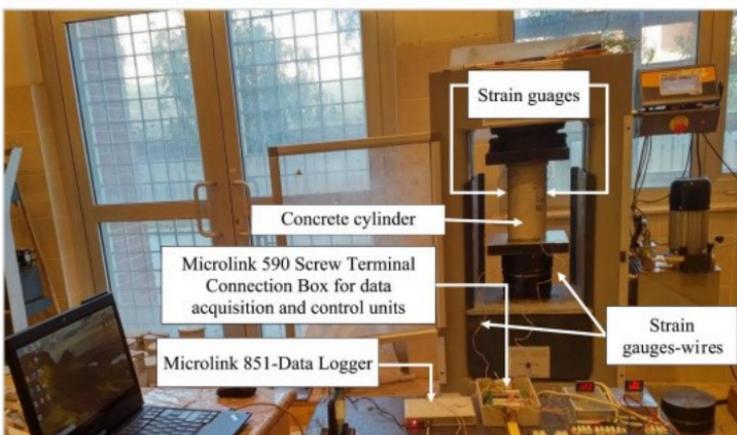
Researchers from the University of Sulaimani in Kurdistan are addressing the problem and investigating using powdered waste glass to replace cement in concrete.

Glass in itself has little cementitious value, but in powdered form and in the presence of water, it reacts chemically with lime to form cement-like compounds.

Several attributes of glass used in this way affect the mechanical properties of the concrete, including chemical composition and particle size.

In a paper published in the European Journal of Environmental and Civil Engineering, researchers Brwa Omer and Jalal Saeed studied the impact of glass particle size and proportion. They made 14 mixtures of various particle sizes, percentages and water-to-binder ratios and used these to make concrete cylinders.

After 28 days they measured the strain values of each of the cylinders using two electrical resistance strain gauges. (Twenty-eight days is an industry standard age for measuring the strength of concrete.) They placed strain gauges half way up the concrete cylinders and connected these to a Microlink 851 data acquisition system to monitor stress and corresponding strain values over steadily increasing loads. Windmill software showed the results graphically.





The experimental results were used to predict the modulus of elasticity of GP-modified concrete based on certain concrete properties.

## Further Reading

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[Microlink 851 - Data Acquisition over Internet and Ethernet Windmill Software](#)

Brwa Omer and Jalal Saeed (2021) [Effect of water to binder ratio and particle size distribution of waste glass powder on the compressive-strength and modulus of elasticity of normal-strength concrete](#), European Journal of Environmental and Civil Engineering, DOI: 10.1080/19648189.2021.1893227

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## Your Data Acquisition Questions Answered:

### Question

Hey there,

I am looking for a solution for measuring an analog voltage (0..500mV) and a resistance with a PC. During my research, I found your products. Could you help me identify, what products are suitable for my application? Thank you very much!

### Answer

The Microlink 752 will read both resistance and voltage signals. It communicates with the PC over USB. More details are at <https://www.windmillsoft.com/daqshop/resistance.html>.

## DAQ News Round-up

Welcome to our round-up of the data acquisition and control news. If you would like to receive more timely DAQ news updates then follow us on [Twitter](#) - [@DataAcquisition](#) - or grab our [rss feed](#).

### Sensor network allows quantification of urban greenhouse gas emissions

The world's first fully automated sensor network for measuring urban greenhouse gas emissions based on ground-based remote sensing of the atmosphere has been developed by scientists in Munich.

Source: Technical University of Munich

<https://www.tum.de/>

### A better way to measure acceleration

Researchers at the National Institute of Standards and Technology (NIST) have developed an accelerometer a mere millimeter thick that uses laser light instead of mechanical strain to produce a signal.

Source: NIST

<https://www.nist.gov/>

### Scientists develop the thinnest and most sensitive flow sensor

This could have significant implications for medical research and applications

Source: University of Massachusetts Amherst

<https://www.cityu.edu.hk/>

### Soft tactile sensor mimics human skin characteristics

It could contribute to various applications in the robotics field, such as smart prosthetics and human-robot interaction.

Source: City university of Hong Kong

<https://www.cityu.edu.hk/>

### **Inspired by bone, new adaptive material strengthens from vibration**

Researchers have developed a new gel material that mimics bone and gets stronger when exposed to vibration, which could lead to new adhesives and better ways of integrating implants within the body.

Source: The University of Chicago

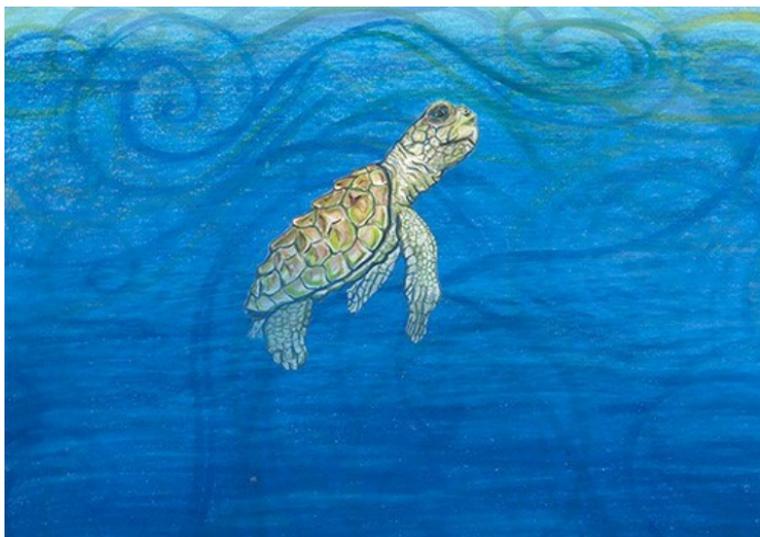
<https://pme.uchicago.edu/>

### **High-resolution ocean model looks at turtles' lost years**

Where do baby loggerhead turtles go in the time after they scramble off the sandy beaches where they are born and swim into the open ocean?

Source: SCUBA News

<https://news.scubatravel.co.uk/>



Oil painting of a juvenile turtle by NCAR scientist Kristen Krumhardt

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