

Breakthrough research finds hyperspectral imaging can characterize building material strengths

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Professor Debra Laefer from NYU's Center for Urban Science and Progress (CUSP), in collaboration with Professor Aoife Gowen and

Zohreh Zahiri from the University College Dublin, recently demonstrated for the first time the ability to use hyperspectral imaging to characterize differing strengths within a single type of construction material. With proper post-processing of the data, hyperspectral imaging can automatically and reliably detect weak from strong hardened concrete and normally fired bricks. All of this is done without any destructive testing or direct contact with the materials. The concrete results were just published in *Construction and Building Materials*.

This technology will help civil engineers and developers rapidly analyze the integrity of [construction](#) materials and assist with the documentation, preservation, and restoration of historical structures, as well as the asset management of our infrastructure.

"Previous studies have shown the ability to use [hyperspectral imaging](#) to correctly distinguish between different materials, such as wood or steel. Our team was able to use the same technology to collect information that enables distinguishing the strength within a single material without touching it or destroying it," said Professor Laefer. "After further study, we believe this technology can be successfully deployed from the air or autonomous vehicles to characterize [building materials](#) at a city-scale, thereby avoiding the need for scaffolding and [destructive testing](#) during building façade inspections and other assessments."

This technology will be an important tool in the future of infrastructure asset management and can have a significant impact on architectural conservation by providing a non-destructive means for safety and serviceability assessments of existing building materials.

More information: Zohreh Zahiri et al. The feasibility of short-wave infrared spectrometry in assessing water-to-cement ratio and density of hardened concrete, *Construction and Building Materials* (2018). [DOI: 10.1016/j.conbuildmat.2018.07.082](https://doi.org/10.1016/j.conbuildmat.2018.07.082)

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