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RFID Will Make Buildings Smart

When my son was heading off to study engineering at Worcester Polytechnic Institute, outside of Boston, I suggested he look at areas that would likely become more important during his lifetime and, therefore, provide strong career opportunities. One example I gave him was smart buildings.

Buildings have been getting smarter in terms of energy efficiency. There are buildings that can provide all their own energy via solar panels, and all the water for toilets via rainwater collection systems. But when it comes to the buildings themselves, they remain as dumb as ever.



That will likely begin to change, albeit slowly. Last year, at our RFID Journal LIVE! conference and exhibition, Smartrac introduced a passive ultrahigh-frequency (UHF) RFID sensor tag that can detect the presence of moisture (see Smartrac Presents Industry's First Passive Moisture-Level Sensing Inlay). The sensor device is battery-free and inexpensive and requires no maintenance, so it can be placed in walls permanently. For a very small additional cost, a building owner can now have an early leak-detection system that can pinpoint the location of a leak.

Also at last year's LIVE! event, Phase IV Engineering introduced a passive strain sensor that can detect the strain on rebar embedded in concrete. These sensors are being embedded in Seattle's Northgate Link Extension light-rail tunnel to help monitor structural integrity during construction (see Contractors Use RFID Sensors to Measure Strain in Seattle Rail Tunnels). The sensors have batteries, enabling them to log readings and store the collected data over time, but they can also work without batteries. So long after the batteries die, workers will be able to read the tags and ascertain the current level of strain on the rebar inside the tunnel walls.

It's likely that buildings in earthquake zones will one day be

built with strain sensors. That way, in the event of a tremor, engineers could quickly—and safely—gather information regarding a building's structural integrity.

Battery-powered RFID temperature sensors are being used in some data centers to monitor the temperatures of different zones within rooms housing hundreds or thousands of servers. This enables companies to more efficiently cool these facilities. In the near future, low-cost temperature sensors could be installed in the walls, ducts and other areas of buildings to monitor heat loss, so the buildings could reduce energy consumption.

I expect, in the years ahead, that we will see chips that are able to detect mold—perhaps *legionella bacterium*, which causes Legionnaires' disease—and other contagions that can spread through air conditioning and heating systems. Trane, a large manufacturer of heating, ventilation and air conditioning (HVAC) equipment, is already using Internet of Things technologies to monitor the health of its HVAC units. I can foresee a day when passive sensors in ducts will tell Trane if hot or cold air is failing to reach a particular area.

The key to smart buildings, of course, will be low-cost readers that become standard equipment in these structures. It's possible that one day, all Wi-Fi routers will also emit passive UHF energy and capture data from sensors in buildings (tag range would need to be much greater than it is today). It might also be possible to have low-cost readers that are affixed to ceiling tiles and powered through an Ethernet cable.

Some might think this is science fiction. I think it's only a matter of time.

Mark Roberti is the founder and editor of RFID Journal. If you would like to comment on this article, click on the link below. To read more of Mark's opinions, visit the RFID Journal

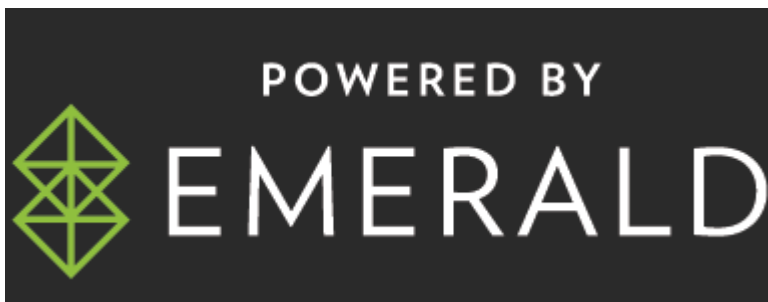
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