

2017 TechConnect Defense Innovation Award

Defense Innovation Summit (DITAC), Tampa, Florida, October 3-5, 2017.



Conductive Concrete Mix for Electromagnetic Pulse Shielding

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The technology resolves the critical national security needs for shielding of electromagnetic pulses generated by a high-altitude nuclear explosion (HEMP) and from sudden magnetic field fluctuations. Conductive concrete is a high-performance concrete building material that can offer built-in electromagnetic field immunity and radiated emission security. A conductive concrete enclosure can provide effective global shielding at the frequencies of interest (10 kHz to 18 GHz). Current technology for EMP shielding is by sheltering EM-sensitive equipment in a Faraday cage or a shelter constructed with metal panels that meets the MIL-STD-188-125-1 standard for shielding effectiveness (SE). EMP shielding concrete costs only about 10% that of the conventional shielding technologies. Maintenance for Faraday cages and metal shelters is labor-intensive and repair costs are high, while conductive concrete shelter is maintenance-free. The test results of a 11 ft by 11 ft by 11 ft conductive concrete shelter have shown 100~120 dB of attenuation, which offers the same level of HEMP protection. As an effective shielding material, conductive concrete can also provide the capability to secure EM signatures and waveforms from within and without C4ISR facilities. The mechanical strength of conductive concrete is about twice that of 4,000-psi concrete. Significant EMP harden costs and life-cycle cost savings can be realized. Conductive concrete is also durable with a targeted service life of 35 years.

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