

Shrinkage Reducing Concrete Admixture

An Exodermic bridge deck is a combination of two standard types of bridge decks: reinforced concrete slabs and concrete filled steel grids. The Exodermic bridge deck was invented by Neal Bettigole, a civil engineer with many years of bridge design experience. He recognized the advantages of the two types, and combined them to gain cost-effectiveness while eliminating or minimizing several disadvantages.

An Exodermic bridge deck is constructed from a steel grid with a reduced-depth reinforced concrete slab cast on top of it. A portion of the grid extends up into the concrete slab and makes one composite unit. The interstices of the grid are not completely filled. In an Exodermic deck, essentially all of the concrete is in compression, while the main bearing bars of the grid carry the tensile forces at the bottom of the deck. Because the materials in an Exodermic deck are used more efficiently than in an equivalent reinforced concrete slab, the Exodermic design is substantially lighter and does not sacrifice stiffness nor strength. The reduced dead load helps achieve higher load ratings, and can have important implications for seismic retrofits. Lightweight and modular, the Exodermic bridge deck can be used to redeck existing structures with minimal interruption to traffic. The slab portion of the Exodermic deck can either be cast-in-place concrete or precast concrete. When the deck panel is precast, bridge decks can be replaced incrementally at night, and the bridge can be kept fully open to traffic during busy daytime hours.

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