

K-2 Innovation concrete technologies in China national infrastructure projects

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ABSTRACT

In the past decades, infrastructure construction in china has been developed rapidly and increased dramatically. Meanwhile, modern concrete structures show the features of diversification and complication, for instance, the ultra-high-rise buildings, the ultra-long-span bridges, the ultra-long-distance bridges, the ultra-large-volume dams, which poses new challenges for concrete technology. In order to tackle the challenges, fluidity regulation technology, cracking control technology, durability improvement technology, and multifunction and ultra-high early age strength concrete technology are development are developed in the construction of China national infrastructure projects. Complex structure and severe environment requires concrete with high fluidity and fluidity retention capacity, therefore high retaining superplasticizer, quick dispersing/viscosity reducing superplasticizer, long-time slump retaining superplasticizer and slump retaining superplasticizer for low/medium slump were separately developed to meet the demands of the infrastructure projects. In order to reduce risk of concrete cracking, water evaporation inhibiting material based on amphipathic molecule technology, shrinkage reducing agent, temperature rise control agent, temperature rise control agent, combination of CaO and MgO based expansive agent were used to form a completely integrated solution. Degradation of concrete structure in a severe environment is a major issue should be concerned in China. Hence, an integrated solution of durability improvement technology consisting of “strengthening surface, densifying concrete matrix, and corrosion-resistant rebar” was proposed to deal with the durability issue of reinforced concrete. in addition, the concept of sustainable development of concrete has been considered in the prefabricated concrete product, when developing multifunction and ultra-high early age strength concrete.