



## Advantages of New Type of Steel Box Coarse Aggregate Reactive Powder Concrete Composite Continuous Beam Bridge

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### Abstract

Coarse aggregate activated powder concrete (CA-RPC) is a new modified material for the large-scale application of existing ultra-high-performance concrete (UHPC), which can improve the technical difficulties of existing materials such as harsh materials selection, high construction viscosity, large self-shrinkage, etc., and has the characteristics of ultra-high strength, low viscosity, low shrinkage, high toughness and high elastic modulus. Nanjing Lvdu Road bridge over New QinHuai River innovatively introduced coarse aggregate activated powder concrete and formed a new composite continuous beam bridge system with steel box. Through comparative analysis with the steel box- conventional concrete composite continuous girder bridge, prestressed concrete continuous girder bridge and other structural systems, the advantages of the new structural system such as large span lightweight, prefabricated assembly, and ecological environmental protection are expounded.

**Keywords:** coarse aggregate active powder concrete; Ultra-high-performance concrete; Steel box-coarse aggregate active powder concrete composite continuous beam bridge.

### 1 Introduction

Ultra-high performance concrete has excellent properties such as ultra-high strength, high toughness and high durability, which can meet the requirements of lightweight, large-span and high durability of civil engineering structures, and is one of the important directions for the development of concrete science and technology.

In order to achieve UHPC ultra-high performance, UHPC preparation techniques typically include

rejecting coarse aggregates, optimizing fine aggregate gradation, adding ultra-fine active mineral blends, autoclaving curing, and incorporating steel fibers[1]. However, the high raw material cost and complex preparation process of PREPARING UHPC limit its large-scale promotion and application. Therefore, in order to reduce the production cost of UHPC, scholars have successfully prepared coarse aggregate active powder concrete (CA-RPC) by selecting gradation-optimized ordinary river sand (tail sand) instead of ground fine quartz sand or using standard