Project overview

Honggu Tunnel, crosses Ganjiang River, is located in Nanchang, China and between Bayi Bridge and Nanchang Bridge. It is the first river-crossing tunnel in inland river midstream in China with dry dock in other area, largest length and scale and double direction 6 lane. The design idea of rapid river crossing, underwater interchange, multipoint evacuation and east-west breakthrough was adopted in tunnel construction. The main line tunnel is 2 650 m in length with a 1 329 m long straight immersed section in river. The immersed tunnel is consisted of 12 elements. The element cross-section is a rectangular reinforced concrete structure with double holes and connection gallery. The outer width of the element is 30 m and height is 8.3 m. An independent dry dock with 2 subdocks is set to carry out element precasting. The element should float a distance of 8.65 km to sinking area. There is Shengmi Bridge, Chaoyang Bridge and Nanchang Bridge (clear span of 62 m) along the element floating line. A new type of 5Y+3X underwater interchange is adopted in tunnel east coast to realize rapid connection between Honggu Tunnel and road network on both coast of Ganjiang River.

Challenges

1. The cofferdam scale is large, and the seepage and flood prevention requirement is high.
2. The element is large in structure, and the crack prevention requirement is high.
3. The float transport distance of element is long, the float channel is narrow, and the element altitude control is difficult.
4. The river is deep and with high flow velocity, and the connection accuracy requirement of the elements is high.
5. The underwater foundation treatment is difficult, and the different settlement control value is small.

Technical achievements

1. The construction technology of long sand-filled bag + plastic concrete wall + clay wall + reinforced concrete wall for temporary large cofferdam is obtained to guarantee the seepage prevention.
2. The concrete mixing proportion with good anti-cracking property and anti-cracking and seepage prevention technology for large concrete structure are obtained; and element precast technology based on separated dry dock is developed.
(3) The element altitude control technology in super-long distance float transport and crossing small-span pier and pier protection technology are obtained.

(4) The technologies, i.e. element sinking and connecting under high flow velocity, long time interval element connecting (about half year) and end element connecting, for long distance and high accurate element connection are obtained.

(5) A new kind of rapid, easy and feasible foundation sand filling method and its effect measuring and evaluating method for inland river immersed tunnel are obtained.
4 Project schedule
The project was started in April, 2014 and completed on 31st May, 2017 with a duration of 38 months.