The lower string arch bridge is 2.2 times parabola, which makes it difficult to control the construction accuracy. Through three-dimensional scanning, the current point cloud model of the completed civil construction on site is constructed in reverse. Based on the comparison between the scanned model and the design model, the analysis of construction deviation and coincidence is realized, and the linear control of the bridge is performed.
**UAV application**

Through the weekly UAV shooting, patrol the whole line of the project, and circle around the key work areas, generate the corresponding panoramic pictures and videos of the project, and directly show the actual construction progress of the project.
Accurate positioning of oblique photography

UAV is used to take corresponding oblique photography for each work site. ContextCapture is used to process the photos to generate oblique photography model. ESP is used for precise positioning. Keyshot or 3D MAX is used to integrate the output tilt photography model. At the same time, this model is used to analyze and control the progress of the labor team at the regular meeting of the project.
Deepen the design and produce blueprint

Optimized modeling of the temporary tower in Revit to ensure that the drawings are consistent, focusing on the review of the fixed end angles of the temporary zipper in the tower body, steel anchor box, and steel anchor box to form a preliminary plan. Convene a special review meeting with the project department and the on-site labor team. After review, put forward corresponding opinions on the preliminary design, form the final plan, output CAD drawings, and process and install on-site.
Formed a special construction plan after several expert reviews.
Structural analysis and construction scheme optimization

BIM Technology is used to realize the seamless conversion from the BIM model of trestle and bracket construction to the structural software, and the simulation analysis and calculation are carried out to optimize the construction scheme, so as to ensure the feasibility and economy of the construction scheme.

Structural stress of bracket and hanging basket under different working conditions

Mechanical Analysis of the Mounting Bracket of the Hanging Basket
**Structural analysis and construction scheme optimization**

1. **Imported original plan model**
2. **Add boundary conditions for mechanical analysis**
3. **Optimized steel trestle model**

- **Increase steel trestle flat-connected diagonal brace**
- **The diameter of the steel pipe pile is increased to φ820**

- **Stability improvement of steel trestle**

- **On-site construction implementation**

- **Form the final plan and confession**
BIM + Smart site platform

Adopt BIM technology + project management (PM) + Internet of Things integrated applications, establish a BIM management platform collaboration platform, and create an innovative project management model based on BIM. Realize the docking with the urban smart construction site system to meet the requirements of the municipal management agency BIM+ smart construction site.
Construction schedule planning and simulation

BIM + Smart site platform

Cost management interface

Integrated view of model and blueprint

Safety Management Interface

Safety VR Education Zone for Labor Teams

AI safety inspection platform (helmet identification)
Docking all module data in the project, and analyzing and predicting the development of data, forecasting and warning of out-of-limit data, realizing advanced control and real-time control.

BIM + Smart site platform

Early Warning and Forecast Center

On-site environmental monitoring station

On-site video surveillance distribution