

CS122402

BIM Implementation in the Construction of a Complex Intersection of Utility Tunnels

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Learning Objectives

- Parametric Modeling
- 3D Coordination of Construction
- Schedule Management
- BIM Implementation in China

Description

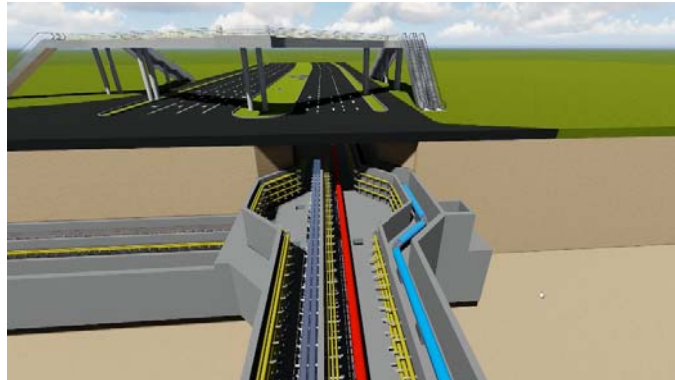
This class introduces the BIM implementation in a comprehensive infrastructure enhancement project including the construction of an underground utility tunnel, an elevated highway and a road in China. The modeling was carried out with Revit, Civil 3D and Dynamo. And the BIM applications mainly include Construction Review, Clash Detection, Collaboration Platform, Schedule Management, 3D Clarification of Construction Techniques, Virtual Construction & VR Experience, Quality Control and Quantity Take-off.

Speaker(s)

Dr. Sheng Bao received his Ph. D in Civil Engineering from Illinois Institute of Technology in 2007. He is now an associate professor in Civil Engineering in Zhejiang University in China. He is also a founder and CEO of a BIM consulting firm in China, Hangzhou Rui Xing Dong Yu Building Technology Co., Ltd. He is actively involved in BIM implementation in construction and facility management.

Project

This project includes the construction of an underground utility tunnel, an elevated highway and a road in a major city in China. The project is 7.86 kilometers long and the construction cost is about 1.5 billion yuan.

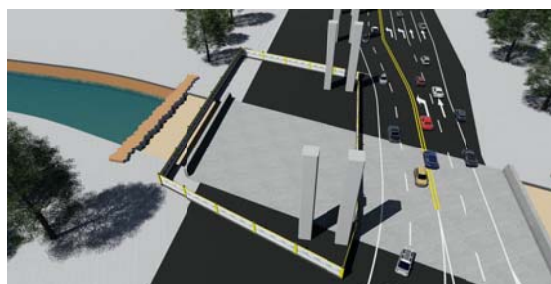


construction scopes

The project includes two stages: the existing pipeline replacement stage and the main construction stage.



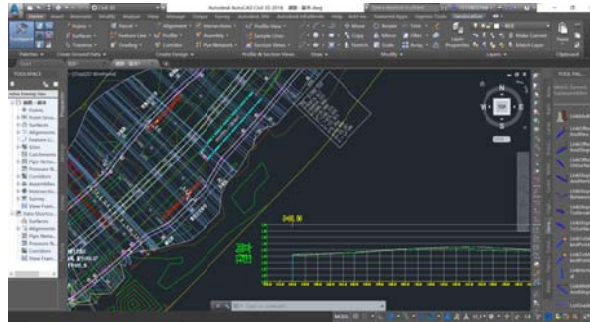
the existing pipeline replacement stage



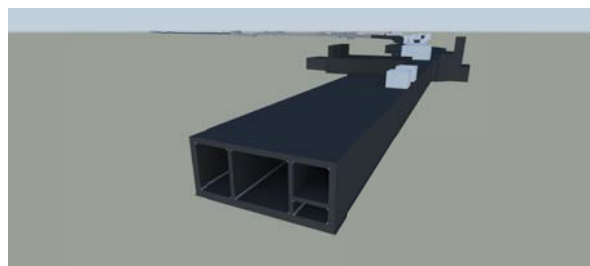
the main construction stage

Parametric Modeling

The alignment and the profile were drawn conveniently in Civil 3D. The road, the tunnel and the elevated highway were created in Revit with a Dynamo program.



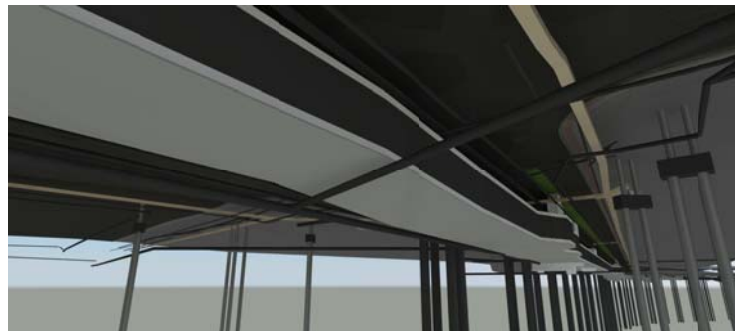
the alignment and the profile



the utility tunnel

Construction Review

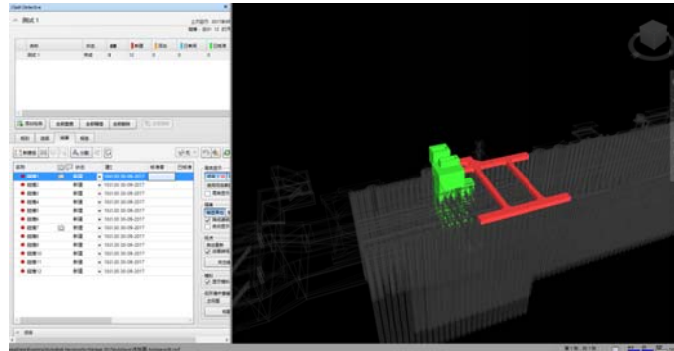
A new sewer pipe should be under the utility tunnel but the pipes were once planned to be constructed after finishing the utility tunnel.



the sewer pipe under the utility tunnel

Clash Detection

Clash detection was carried out to eliminate conflicts among the utility tunnel, the existing pipelines, and the auxiliary structures.



the clash detection tool

Collaboration Platform

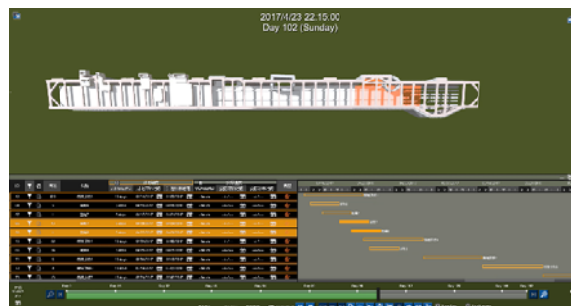
A WeChat program was developed for collaboration.



the collaboration program

Schedule Management

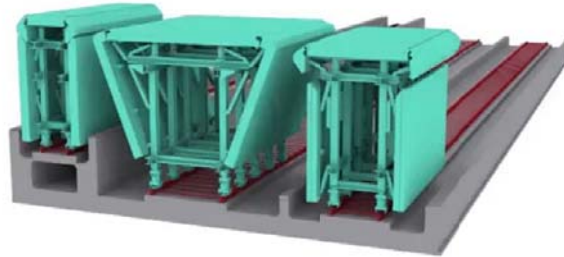
Different colors were used in the model to distinguish the actual construction progress from the planned one, which can help managers with schedule control.



4D simulation

3D Clarification of Construction Techniques

With the help of 3D models , constructability reviews were carried out to help workers understand the construction scopes and details.



the traveling tunnel form

Virtual Construction & VR Experience



The construction process in a road intersection

Quality Control

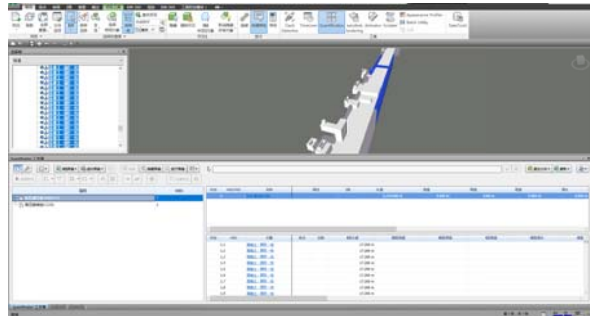
The quality inspection sheets and the photos about on-site quality inspection are stored on the server.



the quality inspection sheets

Quantity Take-off

As the project proceeds, extract quantities from the model, make cost estimates for each stage.



the model containing quantities

BIM applications in China

Design Institute
Contractor
Owner