

COMPANY

Moh & Associates, Inc.

PROJECT

THSR Changhua Station Project

LOCATION

Changhua County, Taiwan

TYPE

Off Ground Train Station

SCHEDULED TIME OF COMPLETION

December, 2015

Life-cycle Management for High Speed Rail Station

“With BIM visualisation technology, all members of the project team can efficiently coordinate with one another to carry out the project.”

— **Kang Szu-Min**

Manager
BIM Management and Engineering
Integration Center

BIM PARTNERS INVOLVED

Project Owner:
Taiwan High Speed Rail Corporation
Architect:
Kris Yao Artech

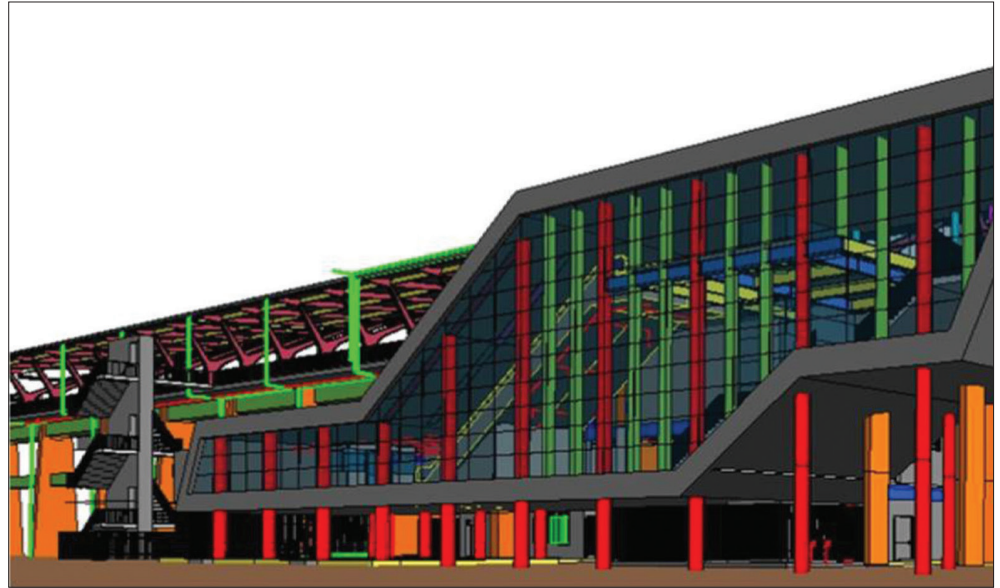


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Construction of Taiwan High Speed Rail (THSR) Changhua Station in west Taiwan, began its on 9 January 2013. KrisYao-Artech, led by renowned architect Yao Ren-Shi, is responsible for the station design. Consultancy services are provided by MAA, which utilises BIM solutions as an effective tool for design, construction, and operational management.

As the station is in a county known for beautiful flowers, its design features petal-shaped pillars and flower-shaped sunroofs that allow natural light into the station. With plants arranged around the interior, the station presents a greener and more elegant space for travellers. A garden forms a symphony of colours to symbolise the character of Changhua County.

BIM: the key to improved quality

One challenge in planning THSR Changhua Station was the existing rail heights, restricting space. MAA implemented BIM technology and

utilised Autodesk Revit, extracting the original 2D designs to create BIM models for detailed design, MEP and structural engineering. Cloud-computing interfaces were also employed, integrating professional designs at an early stage.

In addition, engineers in each discipline could detect design discrepancies and clashes from the models, and then systematically integrate them into clash reports, which were submitted to the design unit and THSR Corporation for further review and adjustments. In the process, THSR Corporation could finalise approvals that would ensure accurate construction and quality design.

“Whether or not the design is proper decides the cost, time and accuracy of the construction,” commented Kang Szu-Min, Manager of BIM Management and Construction Integration Center at MAA. “The BIM team took five months to assist the THSR Corporation with assessing

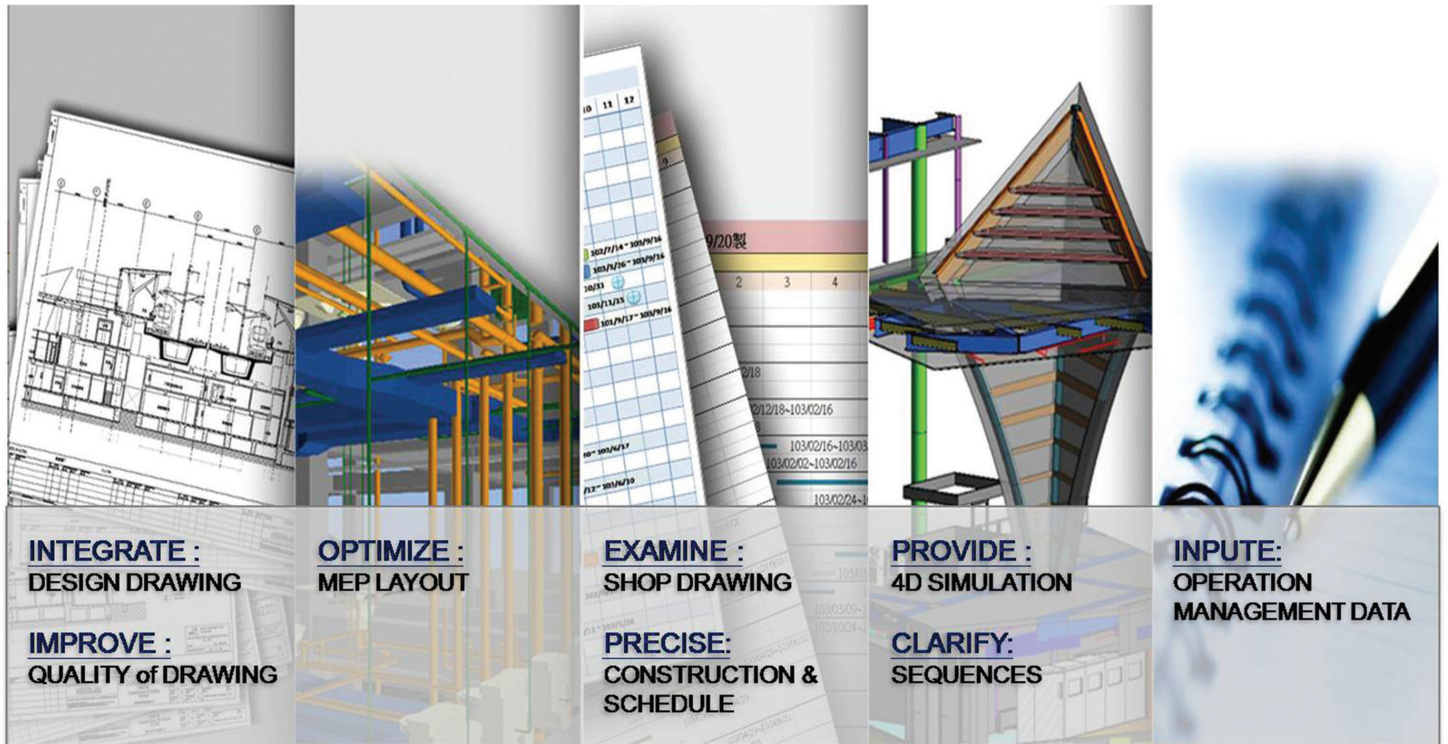


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the design results of the design unit. In the first round of reflection and adjustments, we discovered 98 major issues, which the design unit rectified. After many revisions, design clashes were greatly reduced, and in the fourth round of reflection and adjustments there were only 13 secondary issues to rectify. We not only improved the design quality, but also ensured that we could build the intended structure on time with less information gaps in following construction procedures.”

coordination platform,” commented Kang. “Using this, the project team members received all data, and efficiently coordinated with one another to carry out the project.”

With Autodesk Navisworks, the project team reassessed the construction time and procedures, enabling them to more accurately control the outcomes and progress. The team worked on the artistic design of the petal-

shaped pillars, with a 4D procedure simulation to clearly present the clear installation procedure for staff members. This technology not only enhanced communication, but also accuracy.

MAA could readily utilise the original 3D BIM model to construct a 3D animation required by the THSR Corporation, which learned more about how the station would look like as well

3D visualisation: assisting communication across disciplines

Another advantage of the BIM model is that it enabled effective coordination among disciplines to share annotations, report errors and discrepancies on drawings, and generate clash reports. With the 3D BIM model, detailed designs and construction reviews were beneficial for the client, the designers and the contractors, who then gained a better picture of the construction of THSR Changhua Station.

A “frozen” BIM model in the design phase provided a visualised platform to inspect construction drawings provided by the contractors. For example, the THSR Corporation asked for cross section drawings of the flower-shaped pillars, and the drawings were then compared, with the curvatures of the pillars and the positions of ring beams indicated by the contractors’ design, to check if there were mismatches. These comparisons were directly carried out using BIM, significantly increasing project efficiency. “The visualised BIM technology served as a

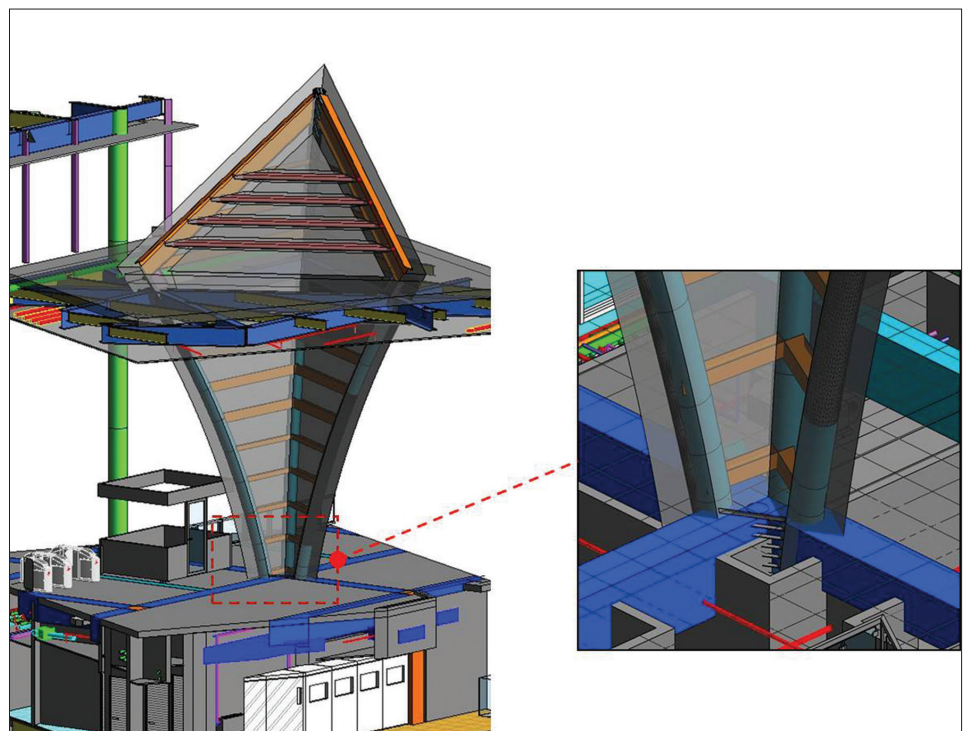


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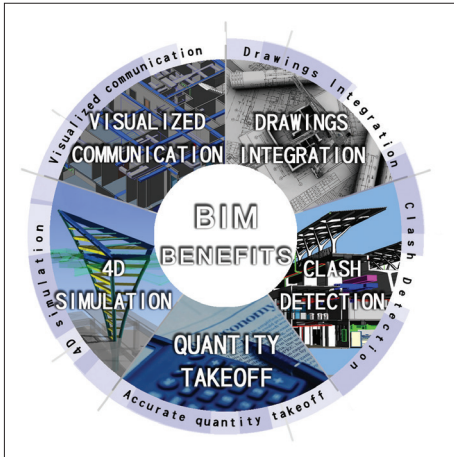


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BIM: unlimited possibilities

BIM is now a necessity for major public infrastructure projects, as well as an effective tool for renowned construction firms in Taiwan and abroad. It has been seven years since MAA first deployed BIM. After countless projects and reflections on them, MAA witnessed the power of BIM. Hence, four years ago, MAA established the BIM Management and Engineering Integration Center, which extends the advantages of BIM to all projects.

“When we look at BIM, we see a bright future,” said Kang. “Take THSR Changhua Station for example: senior managers at THSR have indicated that BIM technology not only reduced costs by 20% and design errors by 80%, but also increased the construction progress by 4%. In future, there will be more functions that can be applied on the BIM platform, such as smart cities and the Internet of Things. As BIM application grows, the future of construction will only get brighter.”

as circulation planning.

Integration of drawings: enhancing operation management

THSR Changhua Station is close to completion. To meet a request from the THSR, MAA imported all designs and construction related models to build a BIM management database that classifies assets such as equipment brands, models and equipment components. The database will be implemented for operation management after the station opens.

“At MAA, we’ve already developed an equipment management system that prints out the list of equipment that must be managed.” Kang commented, “In addition, once all drawings are linked to corresponding items of equipment, integration of drawings and management is achieved.”

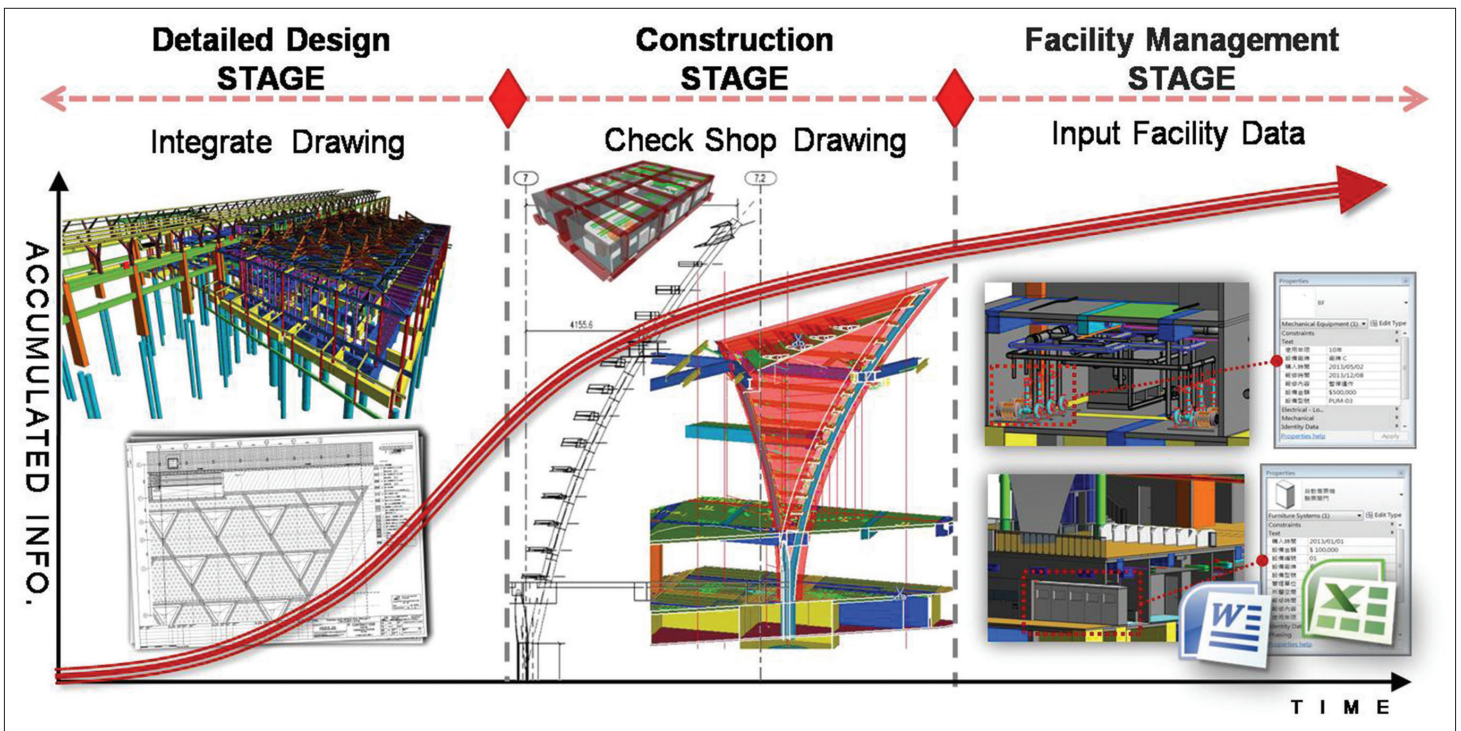


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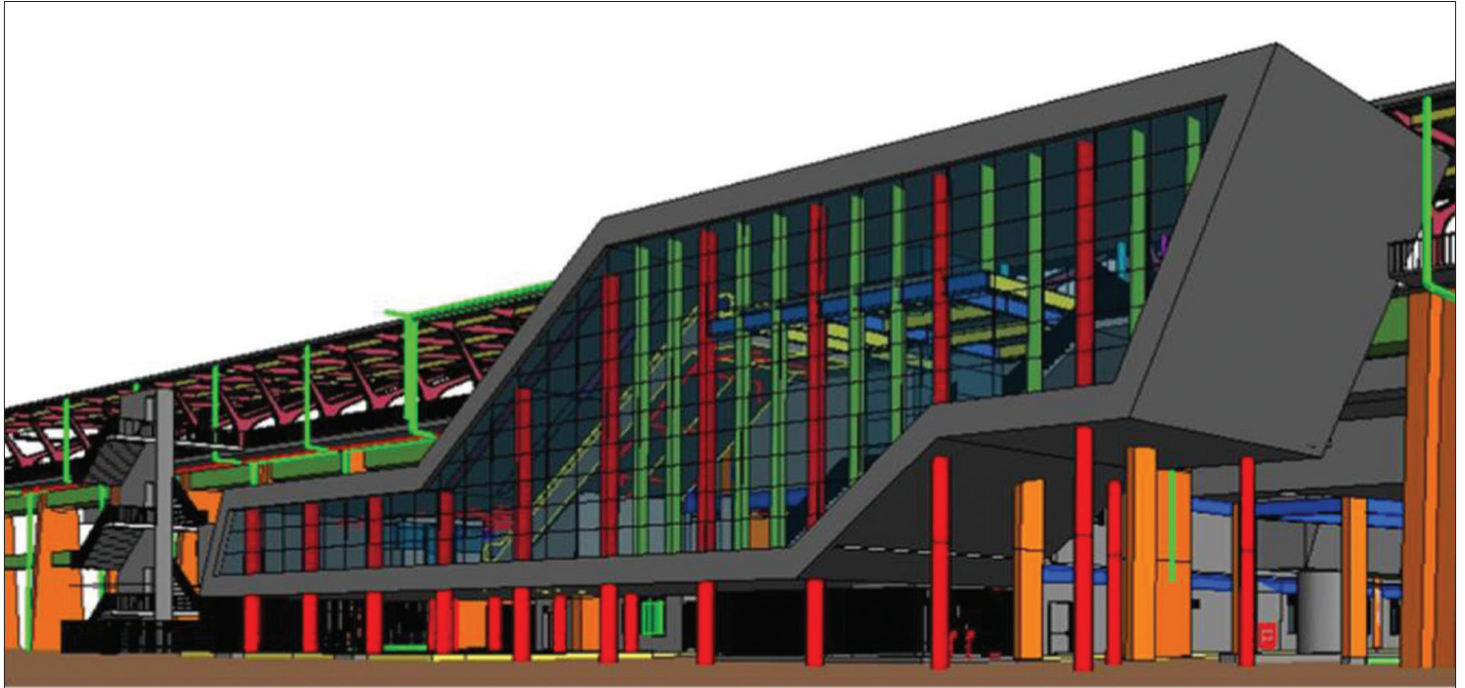


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About Moh & Associates, Inc.

Founded in 1975, MAA is a leading engineering and consulting service provider in East and Southeast Asia, focusing on infrastructure, environment, buildings, land resources, and information technology.

To meet the global needs of both public and private clients, MAA has a full range of engineering capabilities providing integrated solutions ranging from conceptual planning, general consultancy and engineering design to project management.

Today, MAA has over 1000 employees with offices in Beijing, Hong Kong, Macau, Shanghai, Taipei, Bangkok, Singapore and Yangon, creating a close professional network in East and Southeast Asia.