

MRT Jakarta Develops Sustainable Transport to Reduce Congestion and Carbon Emissions in Jakarta

Using Bentley's Digital Twin Applications Saved 10% in Working Time and Reduced Hard Copy Submissions by 90%.

A SUSTAINABLE RAPID RAILWAY INITIATIVE

To address severe traffic congestion along with carbon emissions in densely populated Jakarta, Indonesia, the provincial government Daerah Khusus Ibukota (DKI) Jakarta initiated construction of the city's first mass rapid transit system as a sustainable transport solution. The first 16 kilometers of the expansive railway line were completed in 2019. The project is now in its first part of the second phase and will add 5.7 kilometers of track and a total of seven underground stations to the existing public transport infrastructure. Focused on urban regeneration, it aims to raise public transport use from approximately 30% to 60%, strategically locating energy-efficient stations across the city for convenient passenger access.

PT MRT Jakarta is responsible for construction, operations, and maintenance of the entire MRT infrastructure, as well as business development and transit oriented development around the stations. The sustainable urban transit system will connect all corners of the greater metropolitan area, creating new opportunities for economic growth. "We plan to achieve sustainable excellence by developing a safe, reliable, and comfortable public transportation network," said Imam Detriana, head of project management office division at PT MRT Jakarta. Upon completion, the railway is expected to increase mobility, improve the city's air quality, and provide a solution to the capital's serious traffic congestion problem while transforming people's life habits as they gradually switch from the use of private vehicles to public transportation.

A NEED TO STREAMLINE WORKFLOWS

Located in a congested urban environment amid a national heritage site and canal, the project posed significant technical difficulties, compounded

by multiple contract packages and a large number of deliverables requiring coordination during COVID-19. In addition, due to the global pandemic that initially postponed this phase of the project, PT MRT Jakarta was asked to accelerate the schedule, which meant ensuring that there were no delays caused by data inaccuracies, inconsistencies in design reviews, or miscommunication. They previously tried manually coordinating the contractors and implementing various document management systems during the first phase of the MRT project, but these methods proved time-consuming and inefficient, resulting in information silos. "In Phase I of the project, we utilized other document management systems; however, these lacked collaboration and work sharing capabilities and created information silos," said Detriana. The scattered information also added challenges during railway operations.

Based on lessons learned during Phase I—where contractors used various servers, project approval processes were not automated, and asset data was dispersed—PT MRT Jakarta sought to improve execution during Phase II, streamlining communication among the contractors, stakeholders, and the project team. They wanted to ensure timely and high-quality deliverables, enhancing project information management and implementing coordinated design development and reviews. To achieve these goals, PT MRT Jakarta realized that they needed an integrated technology solution to establish a connected data environment. "We decided to implement the connected data environment to bring the various stakeholders of the project onto a common platform to streamline design development, submissions, and review of project information," said Detriana.

PROJECT SUMMARY

ORGANIZATION

PT MRT Jakarta (Perseroda)

SOLUTION

Rail and Transit

LOCATION

Jakarta, Indonesia

PROJECT OBJECTIVES

- ◆ To develop a safe, reliable, and sustainable public transportation network.
- ◆ To improve asset performance and optimize railway operations through digitized asset data and 3D models.

PROJECT PLAYBOOK

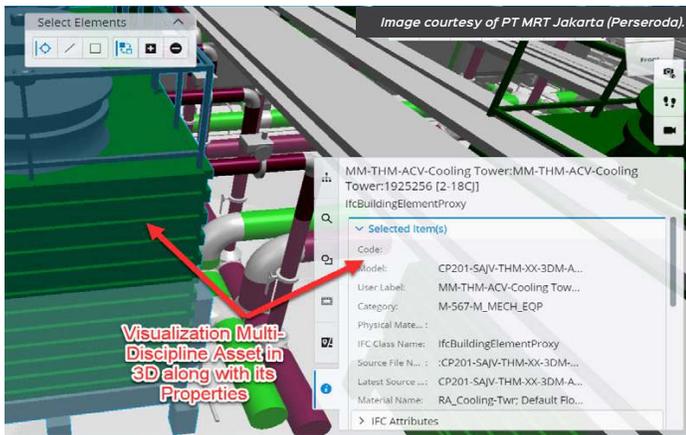
AssetWise[®], iTwin[®] Design Review, ProjectWise[®] 365, SYNCHRO[™] 4D

FAST FACTS

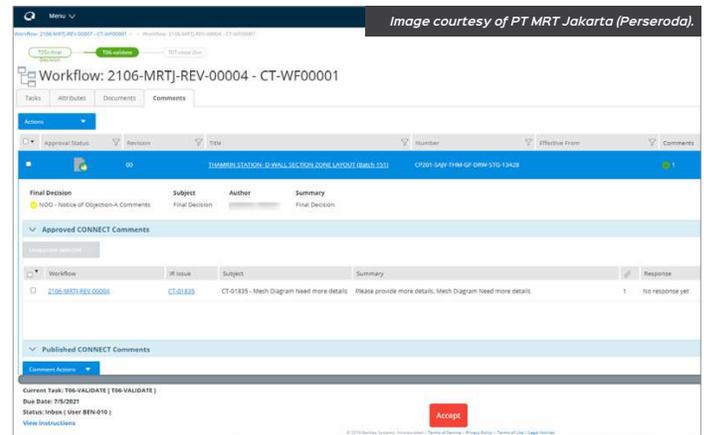
- ◆ MRT Jakarta Phase II A is adding 5.7 kilometers to the city's first mass rapid transport system aimed at reducing congestion and carbon emissions.
 - ◆ PT MRT Jakarta is responsible for construction, operations, and maintenance of the railway infrastructure amid a complex urban environment.
 - ◆ They established a connected data environment to streamline information management and engineering workflows.
- ### ROI
- ◆ Using ProjectWise and the Bentley iTwin platform provided real-time access to trusted information, saving 10% in working time.
 - ◆ The digital solution helped maintain the review of and approval for contractor submissions within a contractual obligation of 30 days.
 - ◆ Working in a connected data environment reduced hardcopy submissions by 90%.
 - ◆ The 3D models and as-built data will be used to help optimize railway operations and maintenance.

“The adoption of [Bentley’s] digital technologies improves project performance and seamless collaboration among project stakeholders while maintaining the quality of deliverables.”

– Imam Detriana, Head of Project Management Office Division, PT MRT Jakarta



ProjectWise and the Bentley iTwin platform enabled virtual design reviews that saved at least 10% in working time.



The 3D models and as-built data will be used to help optimize railway maintenance and operations.

ESTABLISHING A CONNECTED DIGITAL SOLUTION

“We did some assessment at the beginning of this project, where we agreed to use Bentley Systems to provide support using a connected data environment as the primary platform for information exchange,” said Detriana. PT MRT Jakarta selected ProjectWise, AssetWise, and the Bentley iTwin platform to establish a connected data environment to digitalize workflows, manage asset information, and streamline collaboration. The integrated solution provided a consistent workflow and ensured that all contractors, stakeholders, and project participants had access to the most current project information. Working in a unified platform allowed teams to collaborate from multiple locations and perform virtual design reviews throughout the pandemic. It also ensured that all contractors followed consistent methods for data capture, design and drawing production, and review processes. Leveraging the online review and 3D visualization features of Bentley’s integrated digital solution, PT MRT Jakarta streamlined the design process, automating approvals to keep the project on schedule.

To ensure that asset information was collected and captured within the connected data environment, PT MRT Jakarta mandated the adoption of digital business processes, integrating AssetWise to build an asset register to progressively collect and visualize asset information throughout the project. With SYNCHRO, they performed construction simulation to monitor the construction sequence and identify potential interface issues between contractors. “The 3D visualization capabilities helped the team to have a better understanding of the asset that is being designed and constructed and assisted in identifying coordination and interface issues, minimizing rework during construction,” said Detriana. Bentley’s technology solution allowed them to digitalize deliverables, providing 3D models that can be viewed via the web-based model viewer in iTwin applications.

DIGITALIZATION PROVIDES LIFECYCLE RAILWAY RELIABILITY

Using Bentley’s cloud-based applications provides real-time access to trusted project information so stakeholders spent significantly less time gathering and finding the most current data. “This easy access to information saves at least 10% of our working time,” said Detriana. Working in the connected data environment ensures seamless collaboration among teams across multiple locations, streamlining workflows and optimizing productivity. The integrated technology solution enables digital reviews and provides greater visibility and insight into contractor activities, ensuring submissions and deliverables are promptly reviewed, accelerating approval time. Compared to Phase I, PT MRT Jakarta was able to maintain an average reviewing time of contractor submission of 30 days, even during pandemic conditions.

With AssetWise and SYNCHRO, PT MRT Jakarta expects to minimize construction costs and schedule overruns to keep the project on target. By adopting Bentley’s digital delivery platform, they better managed the tight project schedule, minimized delays during the pandemic, and reduced hard copy submission by 90%. Through 3D digitalization of their design and construction processes, PT MRT Jakarta transformed their railway engineering approach, allowing them to leverage industry standards and best practices, streamlining project communication and optimizing construction tasks. By handing over the 3D models and as-built data to operations and maintenance, they will improve asset performance and reliability throughout the railway’s operational life, supporting sustainable transportation for the world’s second-most populated urban area.