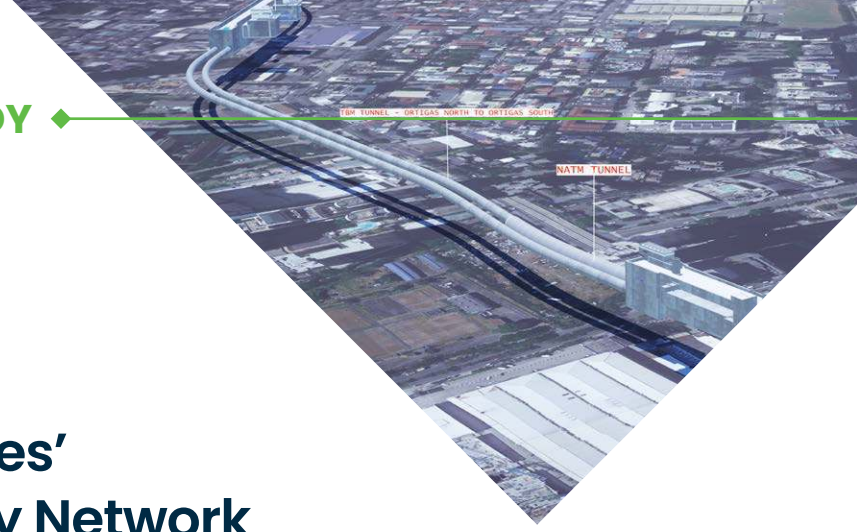
Bentley
Advancing Infrastructure

CASE STUDY



OCG Delivers the Philippines' First Subterranean Railway Network

Using ComplyPro® with ProjectWise® and SYNCHRO™ Will Save USD 7.5 Million on Metro Manila Subway Project

PHILIPPINES' TRANSPORTATION CROWN JEWEL

To ease traffic congestion, reduce environmental pollutants, and provide safe, reliable transportation for Metropolitan Manila, the Philippines Department of Transportation initiated the Metro Manila Subway Project (MMSP). Dubbed the "crown jewel" of the government's infrastructure works, the USD 7 billion transportation network will be the first underground mass transit system in the Philippines.

The project aims to provide better connectivity via a north-south backbone for the Greater Capital Region, cutting travel times between Quezon City and the Ninoy Aquino International Airport from one hour and 30 minutes to 45 minutes. It will enable Metro Manila to meet increasing traffic demands in the years to come. Once operational, the underground railway system will be capable of servicing up to 519,000 passengers daily.

As one of the world's leading integrated engineering consulting firms, Oriental Consultants Global (OCG) was appointed MMSP's project manager, responsible for design review, construction supervision, environmental monitoring, coordination, and support. Committed to excellence, innovation, and sustainability, OCG set out to digitize delivery of the project. "We are using digital solutions to deliver the project cost efficiently and on time with the best quality processes throughout the project lifecycle, from design to construction and operations," said Jose Lorenzo Afable, BIM director at OCG.

COMMUNICATION, COLLABORATION, AND COORDINATION CHALLENGES

MMSP features 37 kilometers of track, 17 stations, and a train depot covering 28.8 hectares across nine contract packages, including seven civil packages, one rolling stock, and one signaling system, making it the largest and most progressive infrastructure project ever undertaken by the Philippine government. Given the sheer scale and complexity of the project—with multiple participants, contractors, and numerous stakeholders—communication and coordination became a monumental task to keep track of all the documents, drawings, and models, while also successfully managing the project. "Equally as important was implementing proactive risk management and monitoring the project cost," said Afable.

With a goal to digitize and streamline engineering workflows, OCG determined that their current software applications and document management and storage system were insufficient to meet the dynamic requirements of this complex, multidiscipline project. OCG realized that centralizing project data and information would make it easily accessible to the entire team and stakeholders. They also found that integrated BIM technology would enable efficient digital modeling and engineering processes and optimize project management. To apply their collaborative BIM strategy, proactively manage risks, and effectively monitor costs, they needed to establish a connected digital data environment.

PUSHING THE BOUNDARIES OF DIGITAL ENGINEERING

The development of MMSP was initiated using digital management systems, and OCG wanted to push the boundaries of how they would deliver the project in a digital environment. They evaluated different technology applications to meet their collaborative, BIM-centric digital engineering needs and found that ProjectWise was the best fit. Leveraging ProjectWise

PROJECT SUMMARY

ORGANIZATION
Oriental Consultants Global (OCG)

SOLUTION
Rail and Transit

LOCATION
Metro Manila, Philippines

PROJECT OBJECTIVES
- To alleviate traffic congestion, reduce pollution, and improve connectivity in Metro Manila.
- To implement collaborative digital solutions for timely and cost-effective railway delivery.

PROJECT PLAYBOOK
ComplyPro, iTwin®, PLAXIS®, ProjectWise, SYNCHRO

FAST FACTS
- The Metro Manila Subway is the Philippines' first underground railway network, expected to reduce traffic congestion by 2.7% per hour and vehicle pollution by 21% in the metro area.
- OCG was hired to manage the complex project and wanted to digitize data and workflows throughout the lifecycle.
- They established a connected digital engineering system to streamline coordination, manage risk, and monitor cost.

ROI
- Leveraging ProjectWise, ComplyPro, and SYNCHRO eliminated rework and shortened the project schedule to save an estimated USD 7.5 million in construction costs.
- OCG established a single source of truth to successfully manage 11,300 documents and 183 BIM models, helping to reduce material wastage and environmental impact.
- Based on the 3D models, OCG plans to develop a digital twin of the railway for future asset and operations management.

"Having Bentley as our partner gave us the confidence to pursue our digital goals. They gave us the proper tools and maximized the potential of what the project can achieve."

– Jose Lorenzo Afable, BIM Director, Oriental Consultants Global

with ComplyPro for progressive evaluation of risks, as well as SYNCHRO for performing construction simulation, OCG established a common digital engineering system and single source of truth. "A common digital engineering system using Bentley software supports the delivery of a collaborative platform, providing a single source of truth for real-time sharing and full coordination of project data," said Afable. Working in a connected data environment, OCG integrated all project workflows and information sources for project planning and programming, requirement and risk management, and cost monitoring. The digital solution provides a unified cloud-based communication workspace and operations dashboards accessible to the entire team and stakeholders.

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With nine different work packages, it was important for the whole team to communicate information in an automated system that integrates with multiple software applications. The interoperability of Bentley's applications provided a unified digital environment to manage, share, and store multisourced data, documents, and models, facilitating and streamlining collaboration among the different contractors. "With this [flexible] system, it is helping us to manage this significant project by providing an integrated platform to incorporate most of our enterprise solutions. We can easily use different BIM design authoring tools within the network and use clash detection processes to minimize rework, saving time, cost, and energy," said Afable. The Bentley-based solution provides confidence for the entire team, ensuring that all data is accessible in real-time and properly managed and shared throughout the project lifecycle.

DIGITIZATION TRANSFORMS RAILWAY DELIVERY AND FUTURE OPERATIONS

By establishing a collaborative digital engineering system, OCG collected and secured project data within a single source that is shared among the project members, including on different devices, accelerating project workflows and transforming project delivery processes. "Bentley Systems' advantage is its connected data environment," said Afable. Working in a connected digital platform enabled real-time data sharing that optimized collaboration to save 5,000 resource hours within the project's first six months. Combining ProjectWise with ComplyPro and SYNCHRO, the team identified and resolved 50 clashes, eliminating rework, shortening the project schedule, and saving costs. The successful BIM-based implementation has already achieved an ROI of over USD 600,000 and is estimated to save USD 7.5 million in construction costs.

Digital engineering and developing a common data environment based on Bentley's technology have played an important role for OCG in this groundbreaking subway project, expected to boost the Philippines' economy through improved connectivity with businesses and enterprises, while drastically reducing vehicle emission pollutants by 21% in the metro Manila area. OCG registered 183 coordinated BIM models within their digital engineering system. The data and material quantities extracted from these models has helped contractors optimize construction planning and reduce wastage that impact project cost and carbon footprint. Providing digital visibility, the models can be utilized throughout construction management and future asset management. "The strategy is to create a digital twin of the entire asset with the integration of sensor information for efficient asset management," said Afable.

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