

Jakarta's Traffic Congestion Shrinks with New Mass Rapid Rail Transit System

MRT Jakarta Spreads out Urban Growth and Reduces Carbon Footprint

Jakarta, the capital of Indonesia, is the largest city in the Southeast Asian country. With a population of 11.25 million living in approximately 664 square kilometers, the metropolis and its surrounding suburbs are the second-most populated urban area on Earth. With one-third of its residents living within the 6,000-square-kilometer greater Jakarta metropolitan area, the significant population density causes immense congestion, and the city therefore ranks as one of the worst municipalities in the world for traffic.

With the rate at which cars are added to the roads surpassing road expansion by some distance and the rapid growth in its population, the city's infrastructure has been unable to keep up, severely limiting public mobility. Beyond this inconvenience, the growth in automobile traffic has made Jakarta one of the highest greenhouse gas-emitting sectors of the country and the city routinely ranks high in [poor air quality](#), posing significant health risks to its residents.

Realizing the critical need to address congestion, and that the carbon emissions it produced were also a leading cause of climate change in the city, the provincial government Daerah Khusus Ibukota (DKI) Jakarta recognized the need for a more sustainable mobility solution. As a result, DKI began construction of the city's first mass rapid rail system in 2013 by way of their land transportation authority PT Moda Raya Terpadu (PT MRT Jakarta (Perseroda)). PT MRT Jakarta (Perseroda) will operate the entire commuter rail line, MRT Jakarta, once the project is complete.

“Previously in Indonesia, not only in Jakarta, the government was focused on private vehicle infrastructure development, such as toll roads, urban roads, and parking areas,” said Silvia Halim, director of construction at PT MRT Jakarta (Perseroda). “Today, the trend is slowly changing with the government now giving more attention to support an integrated public transportation system that is able to raise public interest in the shift from private vehicles to public transportation.”

Despite often stand-still traffic, there has been minimal interest in using public transit, with most Jakartans believing that driving is the most effective form of travel. Many have expressed concern about the comfort, safety, and longer commute times associated with unintegrated mass transit, according to Halim. However, the development of MRT Jakarta as a safe, unified, and sustainable rapid railway is expected to change public perception, increasing public transit use as a result.

Expanding in All Ways

MRT Jakarta is an expansive rail line that will ultimately connect all corners of the greater metropolitan area to its center. The layout will disperse future city growth and create new urban

centers, which will create more opportunity for development in Jakarta's suburbs and stimulate the economic value of the areas around each station. As part of this planned urban expansion, increased accessibility to transit stations in the suburbs will alter traffic patterns, contributing to a reduction in roadway congestion. PT MRT Jakarta (Perseroda) aims to raise public transportation use from around 30% currently to as high as 60% in the future.

"Stations have been built at strategic points across the capital city of Jakarta and are connected to other modes of public transportation to make it easy for passengers to reach their destinations," said Halim.

Creating a sustainable mass rapid rail transit system in Jakarta is essential to enhance the quality of life for residents through reduced roadway traffic, improved public mobility, diminished air pollution, and a lower carbon footprint.

A Decades-Long Project

The approximately 23-kilometer north-south corridor was slated to be constructed in two phases. Phase I of this project consisted of constructing a corridor running 16 kilometers from Lebak Bulus Grab Station to the Bundaran HI Station. The section of the north-south corridor that runs to Bundaran HI was constructed first because the majority of Jakarta's working population lives in this area.

Phase I of the rail line, which opened to commuters in March 2019, comprises 13 stations. Given the public's reliance on vehicular travel, PT MRT Jakarta (Perseroda) expected usage to grow slowly. Citizens were reportedly skeptical about the railway, citing concern over fare costs and its integration with other mass transit systems.

"The Jakarta government has provided subsidies for the operation of the MRT Jakarta so that the costs are in accordance with the public's ability," Halim explained.

Since operation of the transit system began, traffic congestion has reduced, vehicle speed has increased by 3%, and particulate matter pollution has decreased by 18%, according to a 2021 study from Institute for Economic and Social Research, University of Indonesia. In 2019, the rail line saw almost 95,000 more passengers per day, 30,000 more than anticipated. One of the reasons for its swift success has been the reliability of the automated train system.

"In an effort to support citizen mobility, MRT Jakarta's service operations have managed to achieve a 99.88% on-time performance that includes the time to travel from one station to another, a 99.92% exact train dwelling time at stations, and 99.82% arrival punctuality at stations," Halim said.

As commuters have been able to successfully ride on this rail line and recognize its consistency for several years, the public now has greater confidence in the next stage of the project, [according to MRT Jakarta President Director William Sabandar](#).

Phase II of the project continues the north-south corridor railway line from the Bundaran HI Roundabout to West Ancol for a total of 11.8 kilometers. Currently in the construction phase, Phase II is being divided into two stages, with the first stage stretching to Harmoni Station anticipated to be operational in April 2025, and the second stage projected to be completed in 2027.

PT MRT Jakarta (Perseroda) used Bentley Systems' digital twin and project management software to centralize project information and streamline design collaboration. Due to the global pandemic that postponed Phase II, MRT Jakarta was asked to speed up this next stage of the project, which meant ensuring there were no delays caused by data inaccuracies, blockages in design reviews, or miscommunications. Using a connected data environment enabled real-time access to rail design and saved approximately 10% of time.

In parallel with the completion of the north-south corridor, MRT Jakarta is developing and preparing an east-west corridor stretching from Kalideres to Ujung Menteng, considered Phase III. While Phase IV will involve construction of railway lines that form an outer loop in the southern section of Jakarta.

Forward Thinking

PT MRT Jakarta (Perseroda) is focused on urban regeneration and developing infrastructure that excels in all ways. Consequently, the railway stations follow the guidelines of a Transit-Oriented Development (TOD) Master Plan, which improves access to the station and provides a better pedestrian experience through open green spaces and enhanced sidewalks, bridges, and streetscapes for those walking and bicycling to the station.

“Not only are MRT stations close to office areas, but they are also located near a variety of shopping and culinary centers, as well as popular tourist attractions,” Halim explained. The guidelines of development around the MRT stations incorporated improved connectivity to these locales and preservation of any existing heritage sites near the stations.

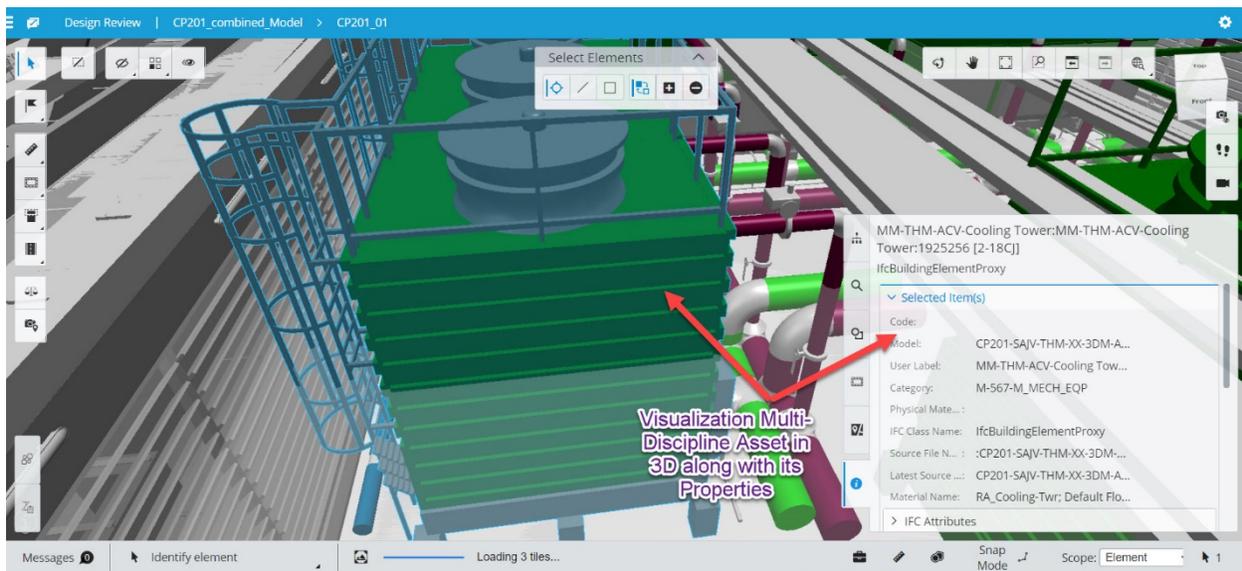
Additionally, the stations are energy efficient, utilizing electricity as their main power source, and they are equipped with LED lighting, non-CFC air conditioning, and energy-efficient platform screen doors at train entrances that block heat from the rail.

“The creation of MRT Jakarta represents a breakthrough in public transportation,” said Halim. “Not only does it increase mobility, but MRT Jakarta also brings with it a number of other benefits, such as improving the quality of the city’s air and becoming 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.”

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[Image 1:](#)



Caption: PT MRT Jakarta (Perseroda) used Bentley Systems’ digital twin and project management software to centralize project information and streamline design collaboration. *Image courtesy of PT MRT Jakarta (Perseroda).*

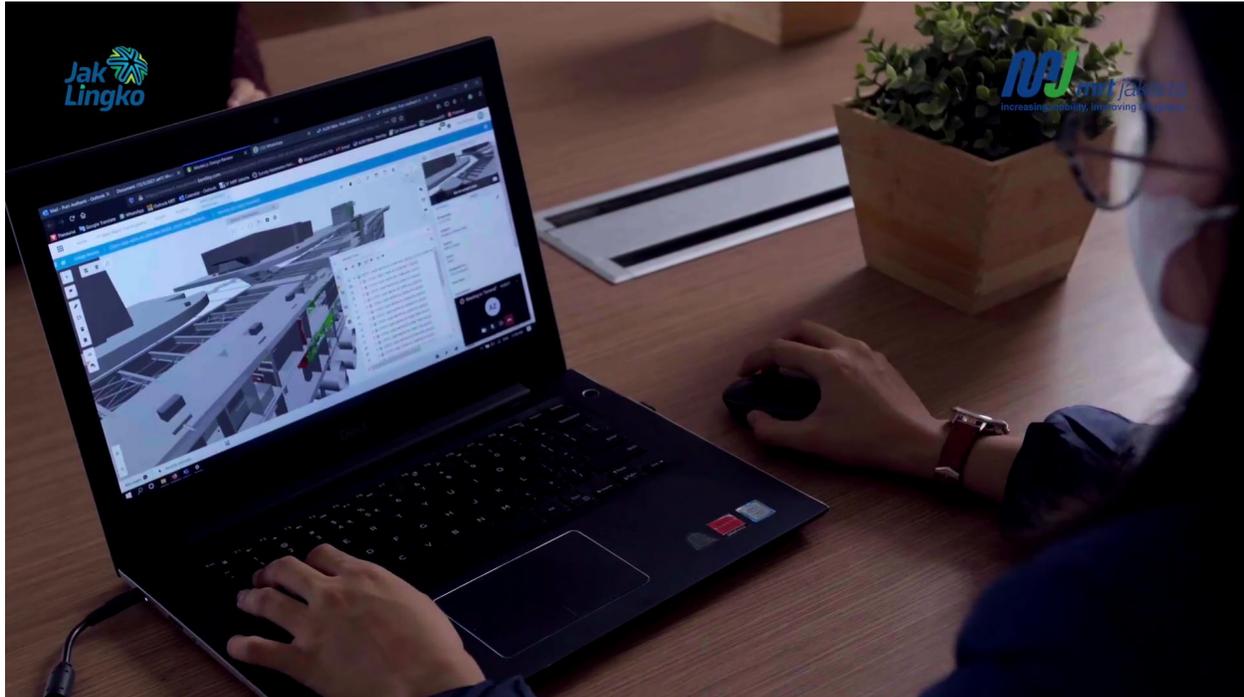
[Image 2:](#)



Caption: Phase II of the project continues the north-south corridor railway line from the Bundaran HI Roundabout to West Ancol for a total of 11.8 kilometers.

Image courtesy of PT MRT Jakarta (Perseroda).

Image 3:



Caption: Using a connected data environment enabled real-time access to rail design and saved approximately 10% of time.

Image courtesy of PT MRT Jakarta (Perseroda).