



Together
we move



Case study Thailand

Bangkok's first monorails

Bombardier's complete mobility solutions for Bangkok's new automated mass transit lines will seamlessly integrate with the city to increase connectivity

Building a modern megacity

The rapidly growing megacity Bangkok is addressing increasing urbanisation by expanding its public transportation network. Bombardier has been chosen to provide the turnkey systems for two new high-capacity monorail lines.

The new lines bring transportation links to new areas of the city, integrate with the existing network and ease congestion.

Bombardier's total scope includes 72 four-car *BOMBARDIER* INNOVIA** monorail 300 trains equipped with *BOMBARDIER* CITYFLO* 650* automatic train control for driverless operation, and the supply of wayside sub-systems.

Bombardier is providing project management, systems engineering and integration, testing and commissioning for the full turnkey systems.

400,000

Passengers daily.

Will benefit from the new monorail lines.

288

INNOVIA monorail 300 cars.

To be delivered to Bangkok as part of the order.



The Pink line, running from Khae Rai-MinBuri, will accommodate the travel demands of northern Bangkok. Meanwhile the Yellow line running from Lat Phrao-Samrong in the city's eastern area will interconnect with four existing and planned mass rapid transit lines including the city's airport rail link.

Making complex simple

Bombardier is a proven turnkey system provider and has managed over 70 complex transportation projects with multiple suppliers and partners – as a one stop provider. As system integrator for the new lines, Bombardier is managing and integrating the supply of sub-systems including: vehicles, signalling, power, platform screen doors, telecommunications, supervisory control and data acquisition, track switches and depot equipment.

This approach reduces implementation times, increases cost control due to risk minimisation and ensures low life-cycle costs and complete integration of all system components.

Ensuring performance and efficiency

The *INNOVIA* monorail 300 system will provide a cost-effective, efficient and attractive high-capacity solution for Bangkok. Designed to integrate seamlessly into the urban environment on a raised guideway, and able to handle sharp curves and steep grades the system is ideal for growing cities with existing infrastructure.

Thanks to its advanced features, such as *CITYFLO* driverless technology and regenerative braking, the system is extremely efficient to operate. Service is frequent, reliable and safe, meaning more comfort for passengers and more revenue for cities.

Delivering capacity and safety

Communications-based train control is tackling the capacity challenge worldwide. It provides advantages for safe and cost-effective infrastructure management for the full range of mass transit systems from heavy metro to light rail and for all grades of automation.

The *CITYFLO* 650 solution is a moving block, automatic train control system featuring continuous, bi-directional train-track communication. Using radio, or LTE 4G, the exact position of the trains is known at every moment. There is no need for physical vehicle detection systems which decreases equipment and maintenance costs.

CBTC reduces the headway between vehicles, enabling trains to run closer to each other compared to a fixed block system. *CITYFLO* 650 can be used as an overlay to upgrade existing systems or for new greenfield lines.

The monorails will run at speeds up to 80 km/h with a maximum capacity of over 28,000 passengers per-hour, per-direction.



| Yellow line |
|---|
| Eastern Bangkok Monorail Co. Ltd. (EBM) |
| 30.4 km elevated monorail guideway |
| 23 new stations, one depot |
| 30 x 4-car <i>INNOVIA</i> monorail 300 trains |
| <i>CITYFLO</i> 650 rail control |
| Wayside systems and system integration |

| Pink line |
|---|
| Northern Bangkok Monorail Co. Ltd. (NBM) |
| 34.5 km elevated monorail guideway |
| 30 new stations, one depot |
| 42 x 4-car <i>INNOVIA</i> monorail 300 trains |
| <i>CITYFLO</i> 650 rail control |
| Wayside systems and system integration |



Growing our local roots

Bombardier is one of the few suppliers delivering technology from Thailand for Thailand. Project delivery, system integration and rail control design and implementation for the projects will be led from Bombardier's regional hub in Bangkok. In 2017, Bombardier opened a dedicated state-of-the-art customer testing lab to support its CBTC projects in Asia Pacific.

Since establishing its Bangkok site in 1997, Bombardier has grown its local team to over 600, working on transportation needs for Thailand, Asia Pacific and globally. Previous signalling projects in Bangkok include for the upgrade and expansion of the existing BTS SkyTrain Green lines and the city's new MRT Purple line. Bombardier is also supplying its first *INNOVIA* automated people mover (APM) 300 system in the city for the new Gold line.

Bombardier is honoured to be delivering the first monorails in Bangkok and, as a committed and long-term partner in this market, looks forward to continuing to provide our customers with smart rail solutions to improve connectivity across Thailand.

Bombardier Transportation

3354/16-19 6th floor, Manorom Building
Rama IV Road, Klongton, Klongtoey
Bangkok 10110, Thailand

Tel +66 2 67 28 290

www.bombardier.com

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