The Bangkok Transit System, Thailand

Turnkey Project

SIEMENS
efficient rail solutions
From 1995 to 1999 Siemens Transportation Systems was responsible for the successful implementation of the Bangkok Transit Systems (BTS) turnkey project. During that time Siemens Transportation Systems contributed substantially to the efficient solution of the following initial situation: The breathtaking rise of Bangkok to one of Asia’s prime economic locations had posed a fundamental problem to the city fathers: how to ensure the mobility of the millions of people who had to travel in this boomtown every day.

An efficient urban transit system – The foundation for economic upturn

82% of all daily journeys were by bus, car, motorbike or taxi. As a result, large parts of Bangkok’s infrastructure were congested and traffic jams were a daily hassle. The travel speed in downtown Bangkok was generally less than 10 kph. Not only was commuter mobility affected, but also the quality of everyday life. The situation had deteriorated to the point where Bangkok was suffering one of the highest levels of air pollution in the world. Besides that, the population of Bangkok had grown tremendously – and with it private car ownership. So it was no wonder that an efficient mass transit system was seen as vital for the further economic upturn of the city.

Therefore, Bangkok had taken on the huge task of getting the traffic moving again. Not by simply expanding road transport but by adding a railway infrastructure to attract road users to other modes of transportation. That lessened the traffic burden on the streets, cut exhaust emissions and enhanced the quality of life in the city.
The modern traffic solution – Bangkok Transit System BTS

Bangkok Metropolitan Administration (BMA) initiated three mass transit system projects. One of them represents the most advanced type of urban railway, the Bangkok Transit System (BTS), an elevated heavy rail system running above the business district of Bangkok. The bottom line: it’s a safe, comfortable and, above all, fast urban transit system.

BTS comprises:
• the Sukhumvit line, running 16.8 km from On Nut to the Mo Chit Bus Terminal;
• the Silom line, running 6.3 km from the National Stadium to Sathorn Bridge;
• 23 stations, spaced at distances of 600 m to 1,400 m;
• depot with stabling yard and workshop;
• and an administration building with control center.

Space-saving construction in cramped urban conditions: 12 m above grade
Trains operate on dual tracks directly fixed to concrete plinths carried on a 9-meter-wide viaduct. Concrete columns rising approximately 12 meters above the roadway median support the single box viaduct girders.

Piled foundations extend some 50 meters underground. This well-proven construction technique is particularly suited to the difficult site conditions and the requirement to save valuable space on the main city centers of Bangkok.

Link with the entire railway system – and with the future
Each 3-car train carries up to 1,100 passengers. Independent ridership studies show that BTS, running 3-car or 6-car units from 5:00 a.m. to 12:00 midnight every day, attracts approximately 650,000 passengers daily and more than triples the average travel speed to 35 kph.

In the start-up phase, the transport capacity is 22,500 passengers per hour and per direction (pphpd) for the Sukhumvit line at a service interval of 2 minutes in peak periods. For the Silom line, the transport capacity is 13,500 pphpd.

BTS will be linked with the other railway systems being built in Bangkok.

The cars: comfortable and safe
All cars are air-conditioned and connected by means of intercar gangways. The passengers enjoy the feeling of all-around comfort, safe and quick transport.

The environment benefits
BTS is an environmentally sound solution for a congested city:
• it reduces Bangkok’s precious space and road surface only minimally;
• all cars are powered by electric motors fed by an electrified third rail, thus avoiding air pollution;
• it incorporates a signaling system that allows automatic driving of the trains at optimum performance and therefore energy-efficient driving conditions;
• power is recovered from braking.

Milestones
April 9, 1992 Concession agreement signed
March 10, 1993 Turnkey tender documents released to five consortia
July 15, 1994 Memorandum of Agreement awarding the turnkey construction to the Siemens-Italian Thai Consortium
October 3, 1994 HRH the Crown Prince presides over the laying of the foundation stone
February 28, 1995 Piling commenced at Ratchadamri Road
July 4, 1995 Turnkey contract signed with Siemens-Italian Thai Consortium
October 3, 1995 First segment erection at Ratchadamri Road
October 2, 1996 Instruction to Commence after final settling of the financing
April 17, 1998 Rollout of the first train at Siemens factory in Vienna, Austria
May 1998 Start test runs in Siemens Test Center Wildenrath, Germany
Start training of BTSC operations personnel by Siemens
October 1998 First train arrives in Bangkok, on-site tests of all subsystems begin
January 1999 Completion of viaduct construction
August 1999 Overall system testing period starts
December 1999 Ready for public operation
BTS – The success story

Sound financing concept

BMA recognized that it was no longer the role of governments to fund infrastructure projects. Instead, the Siam Commercial Bank, the German Kreditanstalt für Wiederaufbau (KfW) and the IFC ensured the sound financing of the project in terms of cashflow and capital structure on a limited recourse basis.

With the start of the commercial operation, BTSC derives all revenues from the operation of the two lines over a 30-year period. During the first five years of operation, Siemens remains responsible for maintenance of the system. When the 30-year concession ends, all the equipment becomes the property of the BMA as part of a so-called BOT (build-operate-transfer) model.

Smooth implementation

The participation of only two companies in this consortium, and the installation of the project management of the contractors and the client in one location in Bangkok, made a major contribution to a smooth implementation.

Siemens as consortium leader was responsible for the design, manufacturing, installation and commissioning of all electrical and mechanical equipment:

- Signaling
- Telecommunications
- Automatic fare collection
- Power supply system
- SCADA system
- 3rd rail system
- Trackwork
- Workshop equipment
- Building engineering services
- Rolling stock

Most of the design and manufacturing activities happened in Europe. Before shipment, the equipment went through the factory tests to ensure a smooth installation and commissioning process. The trains were tested in the Siemens Test Center Wildenrath, Germany, thus reducing the test time in Bangkok. Siemens was also undertaking the planning and the execution of the client’s operation staff training and finally the overall system tests. All together, it took the consortium merely 4 1/2 years to implement this turnkey project – from contract signature to the start of BTS operation.

Bangkok can breathe again

With the new millennium, BTS offers its passengers speed and reliability, which is proving to be a very attractive alternative to road travel. The Sukhumvit and the Silom lines ensure that Bangkok can breathe again.
Attractive, cost-effective and environmentally clean mobility solutions are needed today more than ever before. Making such transportation systems a reality is an extremely complex task, which is why they are often handled on a turnkey basis. Siemens meets this demand by offering not only technically innovative systems, but also immense competence in project management, system integration, project development and financing to ensure that operators the world over are supplied with safe, efficient and custom-made solutions that meet their transportation needs.

Highest quality and safety

When implementing turnkey projects, Siemens Transportation Systems is in the position to reduce interfaces, streamline timetables and therefore consistently cut costs. Cost-effective turnkey implementation starts immediately in the preliminary project phase, when it comes to choosing the right transportation system or taking advantage of cost-saving potentials offered by existing system structures. Over the entire term of the project – from the preliminary planning phase through implementation and after-sales support – all subsystems are optimally coordinated to ensure the highest standard of quality and safety. Internationally experienced and superbly trained, our project management team is there on the scene to act as contact partner to the customer. Siemens provides transparent and efficient project management guaranteeing smooth progress and on-time completion of the work as well as maximum availability of the system. The result is that very often the project is completed ahead of schedule.

The operator takes over a turnkey system or subsystem that is tried, tested and fully operational. On request, Siemens will even assume responsibility for the maintenance and technical operation of the system. Satisfied customers and over 30 successful turnkey projects worldwide testify to the quality of mobility solutions from Siemens Transportation Systems.
The information in this document contains general descriptions of the technical possibilities, which may not be available in every case. The required performance characteristics should therefore be specified individually when a contract is concluded.