New Manila Line Vital To Relieve Congestion

The light metro network is now being expanded in Manila, Philippines. Construction of the planned LRT Line 3—which was delayed for several years by a series of political disputes—began finally in October 1996. Funding for the $US 655 million project was expected to be secured by the beginning of this month, and commercial service is scheduled to start in July 1999.

MANILA's new 22.2km light metro line is being built along the route of Epifanio De Los Santos Avenue (Edsa), an intensively road transport corridor which currently carries 300,000 vehicles/day, including 11,000 buses. This equates to an estimated one million passengers daily.

The Edsa LRT project is regarded by the Philippines' government as vital to alleviate chronic traffic congestion which it believes is now having an adverse effect upon the economic development of the city as well as the quality of life of its residents. At present, the number of lanes on the 24km highway varies between five and six in each direction, including two dedicated for buses. However, these are often jammed completely by the sheer volume of traffic.

Edsa extends from the McArthur Highway at Monumento Circle in the northern district of Caloocan to Roxas Boulevard in the southern district of Pasay. It forms a semi-circular ring road which connects with a number of radial roads serving the central business district of Manila. The highway cuts through the districts of Caloocan, Quezon, Mandaluyong, Makati, and Pasay, as well as San Juan.

Major commercial and industrial centres served by the corridor include Monumento/Balintawak, North Avenue, Cubao, Ortigas, Shaw, Guadalupe, Makati, and Baclaran.

The dedicated double-track Edsa light rail line, occupying a 10.5m-wide section within the Edsa corridor, will comprise 48% elevated and 41% at-grade segregated sections, plus some short underground sections which should ensure that highway capacity is not reduced. It will connect with both ends of the existing elevated 14km LRT Line 1, which is also to be upgraded and operated by a new fleet of 28 LRVs (IRJ October 1996 p48). Effectively, this will provide the city with a circular light metro system—operated by conventional LRVs—to relieve its overall traffic problems.

The Department of Transportation and Communications (DOTC) awarded the build, lease and transfer (BLT) contract for LRT Line 3 to Metro Rail Transit Corporation (MRTC), which is responsible for designing, building, equipping, testing, and commissioning the system. The BLT contract covers the delivery of track, signalling, communications, power supply, stations, maintenance facilities, and LRVs.

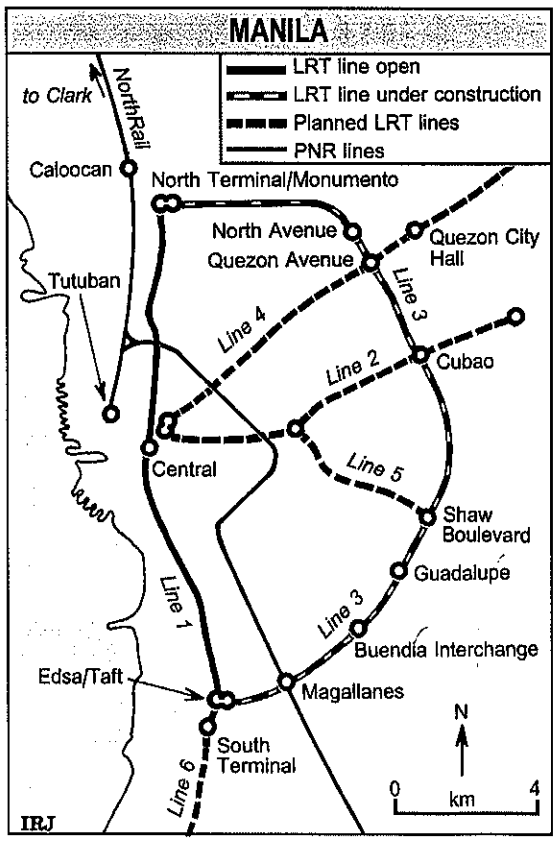
A turnkey contract for design, procurement, and construction has been awarded by MRTC to Sumitomo Corporation, Japan, which has selected Mitsubishi Heavy Industries, Japan, as its principal subcontractor for the civil works, track work, and electro-mechanical systems, and CKD Tatra, Czech Republic, to manufacture, test, and commission the initial fleet of 73 type RT8M LRVs which will operate the line.

MRTC has also retained Kaiser Engineers, United States, to provide project management and supervision during the design, construction, and commissioning stages. Kaiser was a leading member of the consortium which had the original proposal to build the line accepted in April 1992, but rejected subsequently by a different government the following year. Further legal, financial, and political battles have served only to postpone or delay the scheme (IRJ December 1994 p32).

Finance for the project will be raised from a number of sources, with lenders' cash due to be made available by the beginning of this month. The Export-Import Bank of Japan has agreed to loan $US 254 million towards the cost of infrastructure, while domestic banks have also promised funding worth $US 107 million. Financial institutions in the Czech Republic will provide loans amounting to $US 104 million towards the cost of the LRV fleet, and, equally importantly, the remaining $US 190 million has been pledged as equity by private investors in the Philippines.

The main barriers to proposed financial packages in the past have been the lack of private capital committed to the project, and a long-running argument over guarantees for the repayment of loans.

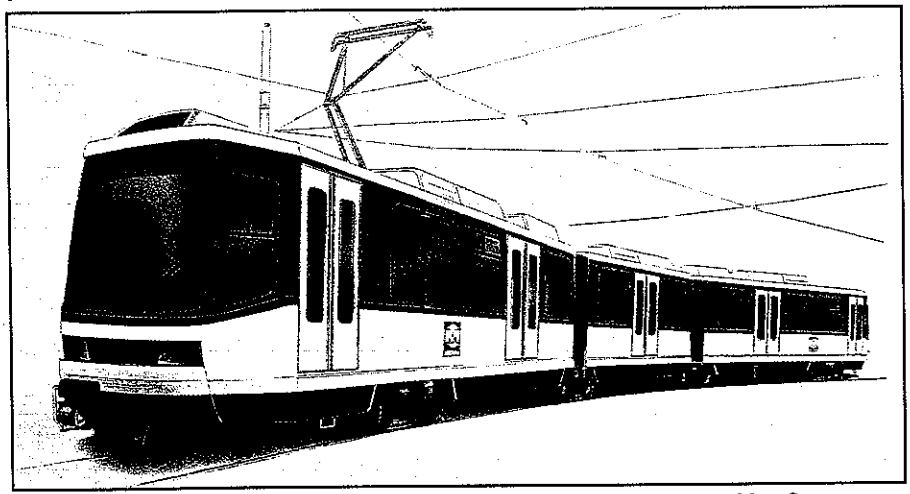
However, these obstacles appear to have been overcome. The politicians are now satisfied that there is sufficient private sector investment, while the lingering doubts about whether the government will, in turn, meet its obligation to pay rental fees for use of the line throughout the 25-year period of the BLT concession have been dispelled as a result of political risk insurance being secured against all of the



Line 3 is being built along the congested Edsa corridor.

LRT LINE 3 DATA

Cost: $US 655 million.
Private investment of $US 190 million provided by Philippine companies including Fil-Estate Management, Ayala Land, Anglo Phil-Philippine Holdings, RamCar, Greenfield Development, DBH, and Antel Holdings.
Turnkey contractor: Sumitomo.
Civil engineer sub-contractor: Mitsubishi Heavy Industries.
LRV fleet supplier: CKD Tatra.
Domestic trackwork partner: John Holland Philippines.
Domestic civil engineering partners: EEI Corporation and Asia Construction & Development Corporation.
Other suppliers: Siemens, Adtranz, Mitsubishi, Bosch, Meidensha, Philips Electronics & Lighting, Omron, Meralco Industrial Engineering Service, Design & Products International.



Impression of the new LRVs being built by CKD Tatra for Manila's new Line 3.

loans provided by the Japanese and Czech backers.

DOTC will maintain overall supervisory powers during design and construction to ensure that all of the specifications are met successfully, and it will operate the line throughout the concession period. MRTC will provide technical management following the opening of the line, and it will also assume responsibility for some maintenance and repair services.

Line 3 will be built in two stages. The initial 17km section will extend from North Avenue in the district of Quezon south to Taft Avenue in the district of Pasay, and the second 5.2km section will extend from North Avenue north-west to Monumento Circle.

Services will operate at a commercial speed of 47km/h, with station dwell times of between 20 and 30 seconds, and an estimated end-to-end journey time of 30 minutes on the completed line. Maximum line speed will be 65km/h.

There will be 13 stations, including two at grade and two below ground level, with the remainder on elevated sections. Each will comprise a concourse divided into two areas—one accessible to the general public, accommodating shops and automatic ticket vending machines, and the other accessible only via entry gates which allow the passengers to reach the secured platform area.

LRVs will normally operate in three-car consists, though the RT8M fleet will also be operated as four-car multiple units at a later date. Each three-section eight-axle articulated vehicle will be powered by two IGBT transistor choppers, controlling eight self-ventilated traction motors each with a 64.5 kW output. The choppers provide both regenerative and dynamic braking.

Steel-Bodied LRVs

The 30.3m-long steel-bodied, air-conditioned LRVs will have five double-leaf electrically-operated plug-sliding doors on either side. Each vehicle will have a seated passenger capacity of 74 and a fully loaded capacity of 394.

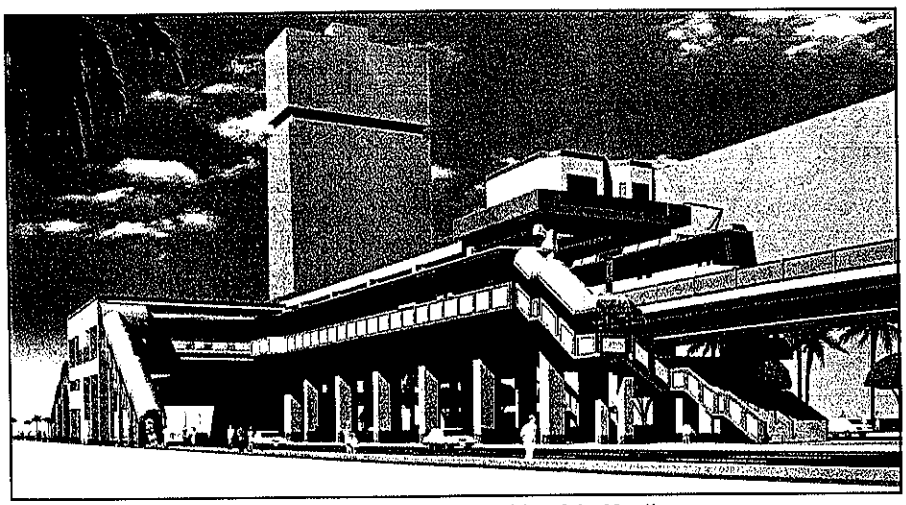
The fleet will be maintained at a 16-hectare depot at North Terminal, where facilities will be built for light and heavy maintenance, and there will be space for the storage of 81 vehicles initially, with an option to expand to accommodate another 40.

Signalling on the line will be a non-permissive, automatic block signal (ABS) system, coupled with ATP. Data will be transmitted to the driving cab via beacon transmission units and displayed on the driver's ATP panel. Speed restrictions, such as those applying at sharp curves, cross-overs, turnouts, and stations, will be computed as line description data to ensure that the maximum speed is not exceeded on these critical sections. The driver will be able to by-pass ATP, however, where there is a failure or where the vehicle is being moved within the depot.

It is planned to include a number of communications systems. A private automatic branch exchange (PABX) system will provide the primary communication between the control centre and station staff, while a radio system will provide operational, maintenance, and emergency communication links. The train-borne public address system will be supported by an additional two-way link between cabs at the end of a single or multiple-car consist.

Stations will have loudspeaker public address systems on concourses as well as on the platforms, where there will also be closed circuit television (CCTV) to enable the drivers to view passengers boarding and alighting LRVs. Additional cameras will allow station controllers to monitor the movement of passengers on concourses and within lifts, as well as on platforms.

The traction electrification system will supply power from Manila's 34.5kV ac primary power supply to the line's overhead catenary via eight sub-stations, located at North Avenue, Kamuning, Santolan, Ortigas, Guadalupe, Ayala, Magallanes, and Taft. Each sub-station will be equipped with one or two 3000kW 750V rectifier units, connected in parallel to a 750V dc switchboard and a 34.5V/480V auxiliary transformer which will supply traction power as well as meet the requirements of the stations. **IRJ**



Typical design of an elevated station on the new Line 3 in Manila.