

# Technical Visit to RapidKL Depot, Subang

PROJECT MANAGEMENT TECHNICAL DIVISION



by Ir. Noor Iziddin Abdullah bin  
Hj. Ghazali

**RANGKAIAN** Pengangkutan Integrasi Deras Sdn Bhd (RapidKL), a subsidiary of Syarikat Prasarana Negara Bhd (Prasarana), provides an integrated public transport system in the Klang Valley incorporating rail and bus services. Incorporated in July 2004 and operational since November of the same year, RapidKL today transports approximately 600,000 passengers daily: 350,000 on both the Ampang and Kelana Jaya LRT Lines and 280,000 on the bus system. RapidKL provides services across 48 rail stations and 163 bus routes.

The objective of the visit on 16 June 2010 was to provide an opportunity for engineers to have a better insight into the current LRT operations as well as new LRT projects including the proposed new LRT extension line. Participants also had the chance to visit the LRT maintenance depot. The visit was coordinated by the Project Management Technical Division (PMTD) of IEM and the CSR & Internal Communication, Communication Division from RapidKL. We would like to thank Ir. Nor Hassan Ismail, COO, Rail of RapidKL for granting this visit.

The IEM delegation arrived at RapidKL Depot, Subang, before 9.00 a.m. and was warmly welcomed by the CSR and Internal Communication of RapidKL who represented its management. We were then ushered into the meeting room for a presentation. The first presentation was on the operation and engineering of both the RapidKL LRT lines, namely, the Kelana Jaya Line and the Ampang Line.

## KELANA JAYA RAIL LINE

The presentation began with Hj. Bukhari Muhamed, Head of Rail Operation Division of RapidKL, who briefing us on the Kelana Jaya Rail Line, formerly known as the PUTRA Line. The line stretches from Gombak to Kelana Jaya including the Subang Depot. There are five underground stations, 18 elevated stations and one at-grade station. Total distance is about 29km. The Kelana Jaya Rail Line is equipped with sufficient facilities for the disabled.

Hj. Bukhari also briefed us on the system. The cross section of the elevated guide-way consists of the viaduct section on the median road sitting on precast concrete segmental road. The construction of the Kelana Jaya Rail Line commenced in 1994. Section 1 was completed on 1 September 1998 and Section 2 on 1 June 1999. The system consists of a centralised control centre, fully automated driverless trains, minimum 90-second headway, moving block ATC system and a safety distance of 30m to 100m.



Figure 1: Overview of the train maintenance workshop



Figure 2: IEM participants during the RapidKL presentation



Figure 3: A look under the LRT

The vehicle is made by Bombardier (Canada) to accommodate 400 passengers per two-car train and 800 passengers per four-car train with an average speed of 40kph. It uses a single loop operation between Terminal Putra and Kelana Jaya on double track with a maximum capacity of 11,000 passengers per hour per direction (pphpd). Currently, the Kelana Jaya Line operates 35 two-car trains and 10 four-car trains with an average ridership of 165,000 per day. The operating hours are from 6.00 a.m. until midnight whilst maintenance is carried out from 1.00 a.m. until 4.30 a.m. During peak hours, the LRT serves passengers within intervals of less than 3 minutes. The Kelana Jaya Rail Line has a minimum fare of RM0.70 and a maximum fare of RM2.50.

The uniqueness of the Kelana Jaya Rail Line lies in its five underground stations with a distance of 4.36km twin independent bore. There are two tunnels with an internal diameter of 4.88m. The distance between the two tunnels is 5m. There are many safety features in this system such as CCTV, Stop Button, Evacuation shaft, Zones, Fire Protection system, covered power rail, etc, just to name a few.

During the presentation, many participants enquired on the progress of the technology for the current system and also on the extended line to Putra Heights. We were told that the work of the extended line will commence by the final quarter of 2010 and is targeted to be completed by 2013.

### AMPANG RAIL LINE

Hj Bukhari then proceeded to brief us on the Ampang Rail Line which was previously known as the STAR-LRT line. The civil work consists of a 27km double-track route. The track is partially former KTM freight alignment. It has 16km at grade on ballast and 11km elevated on viaduct. There are a total of 25 stations:

- Seven stations on the Ampang Line
- Seven stations on the Seri Petaling Line; and the remaining
- 11 on the common section between Chan Sow Lin and Sentul Timur

There is a control centre for the entire Ampang Rail Line situated at the Ampang Station. All train operations are monitored and managed using SCADA systems. There is also a Fixed Block Automatic Signalling System for vehicle movement. The power supply system consists of 15 rectifier substations; six of which with 11kV infeeds and nine with 33kV infeeds. The transformers are 3-phase dry type with 1800 KVA and 1300 KVA power ratings. The operation and maintenance hours are the same as the Kelana Jaya Rail Line.

The fare for the Ampang Rail Line has a minimum of RM0.70 and a maximum of RM2.80, which is RM0.30 more than the Kelana Jaya Rail Line. There are 25 trains rolling on the track, each consisting of six cars. However, the average ridership is only 130,000 per day.

### OVERVIEW AND ENGINEERING

The next presentation was by Ir. Zohari Sulaiman, General Manager of Rail Engineering Division. Ir. Zohari first briefed us on the corporate structure of Prasarana. It is 100% owned by the Ministry of Finance with one golden share owned by Khazanah Nasional Bhd. It operates an integrated public transport system comprising bus, monorail and LRT services.

The bus service covers six major areas in the Klang Valley serving an average of 280,000 passengers daily. The fleet consists of 1091 buses maintained at 10 bus depots. There is also a Rapid Penang bus service with 350 buses



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Figure 4: Group photo of the technical team of RapidKL and IEM participants



Figure 5: Ir. Lee presenting a memento to Ir. Zohari

plying 35 routes and serving 46,000 passengers daily. The monorail service is known as the KL StarRail. It has 12 two-car trains running on a 8.6km track with 11 stations in total. The average daily ridership is 57,000 in 2009. There is also a cable car service operating in Langkawi by Panorama Langkawi Sdn Bhd. It has 35 gondolas (six pax per gondola) with a hanging bridge of 600m, covering a distance of 2.2km within three stations.

The RapidKL LRT services consist of the Kelana Jaya Rail Line, with a fully automated driverless LRT system, and the Ampang Rail Line with a manually driven LRT system. The combined average ridership is 350,000 passengers per day.

Ir. Zohari continued the presentation with the organisation structure of his division, outlining the tasks and responsibilities of each department. This is followed by a briefing on the technical aspects. The rolling stock of the Kelana Jaya Rail Line consists of 35 old two-car trains and



Figure 6: Ir. Lee presenting a memento to Hj. Bukhari

35 new four-car trains. The AC power distribution consists of 132kV intake from TNB (Jelatek & Kerinchi Bulk Supply Substation), 33kV ring system internally (15 traction power substation) and finally the 415V RMU system for passenger stations. The DC power is a step-down conversion from 33KV AC to 750V DC. The track mounted equipment consists of an insulator chair, LIM rails, running rails, PIES, power rail and switch machines.

The Ampang Rail Line vehicle is manufactured by Adtranz, Germany. It consists of 30 six-car trains. However, the AC power distribution consists of four units of RSS with 33kV intake from TNB, five units of RSS with 33kV ring system internally, six units of RSS direct feed from TNB and the 415V RMU system for passenger stations. The DC power is also a step-down conversion from 33KV AC to 750V DC. For the track network, the at-grade track consists of ballast, third rail, rails and sleepers, whereas the viaduct track has plinth.

The final presentation topic was on the line extension project and new line project. Ir. Zohari explained the overall route of the new line starting from Sri Petaling and Kelana Jaya, both converging at Putra Heights. There is also a proposed new line from Sg Buloh to Kajang across the Central Business District of Kuala Lumpur which is envisaged to be completed by 2020.

The presentation was followed by a tour of the train maintenance workshop. The tour started at 11 a.m. and finished at 12.30 p.m. including a visit to the control centre. Before heading back to IEM after lunch, the Vice Chairman of PMTD, Ir. Lee Boon Chong, presented a memento each to both Ir. Zohari and Hj. Bukhari. ■

### Circulating in cyberspace...

#### Always Aim Higher

The tragedy of life is not found in failure but complacency. Not in you doing too much, but doing too little. Not in you, living above your means, but below your capacity. It's not failure, but aiming too low, that is life's greatest tragedy.

**Benjamin E. Mayes**