JAIPUR METRO RAIL CORPORATION LTD.

REPORT

on INDUSTRIAL VISIT

17/01/2017



Organised by: Computer Science Department Jaipur Engineering College & Research Centre Jaipur Total No. of Student: 173

Faculty Coordinator:

Mr. Gajendra Sharma Mr. Ashish Ameria

STAFF INVOLVEMENT GROUP (SIG)

Pulkit Mathur (DGM S& T)
Arun (Chief Controller OCC)
Ashish Yadav (JEN)
MuneshMeena (JEN)

ABOUT JMRC

Date of incorporation: - 01.01.2010

Date of Commencement of business: - 20.01.2010

Date of Commencement of Commercial operation (Phase 1A):- 03.06.2015

Ministry/Department: - Urban Development & Housing Department, Government of Rajasthan

FACTS ABOUT JAIPUR METRO:

- 1. The estimated cost of the Jaipur Metro Rail Project is Rs 2025 crores.
- 2. Jaipur Metro Rail Project is one of the fastest project implementations in Metro sector that was completed in about four years and a quarter.
- Jaipur Metro project is totally funded by the state government and its agencies, namely, Rajasthan Housing Board, Jaipur Development Authority, Rajasthan State Industrial Development and Investment Corporation Ltd.

- 4. When it comes to planning, Jaipur Metro is a good example of multi-modal integration, as it is connecting the Railway Station and the Inter-State Bus Terminal; and Metro feeder services are also launched by Jaipur Metro Rail Corporation.
- 5. As an effort to reduce energy consumption lead to 30 percent energy saving as procured rolling stock uses regenerative braking system.
- 6. A rainwater harvesting system has also been built into the design.
- 7. Free drinking water at all the Metro stations.
- 30 percent of Jaipur Metro's staff are women including operation and maintenance staff, train operators and station controllers.
- 9. Up to 15% discount has been offered on Smart Cards to encourage their usage.
- 10. Tourist Cards like One-day Tour Card and Three-day Tour Card, have been introduced, which can be used for unlimited number of trips during the days of their validity.
- 11. Latest security equipment's have been provided at all Metro Stations

ROLLING STOCK

The Metro uses 1,435 mm (4 ft 8 $\frac{1}{2}$ in) standard gauge rolling stock. Trains are maintained at Mansarovar Depot for Pink Line. In December 2011 BEML was awarded a 318 crore contract to supply 10 four-car trains for Phase 1. The Jaipur Metro plans to lengthen the trains later to 6 coaches as the traffic increases. BEML expects a follow-on order worth 60 crore.

Thus these rolling stocks are said to be indigenous and are manufactured by BEML at its factory in Bangalore. The trains are four-car consists with a capacity of 1506 commuters per train, accommodating 50 seated and 292 standing passengers in each coach. These trains will have CCTV cameras in and outside the coaches, power supply connections inside coaches to charge mobiles and laptops, better humidity control, microprocessor-controlled disc brakes, and will be capable of maintaining an average speed of (20 mph) over a distance of 1.1 km (0.68 mi).

Trains on the metro operate at a maximum speed of 80 km/h (50 mph), and an average speed of (20 mph). Maximum speed is limited to 42 km/h (26 mph) at curves. During operation gate automatically closes and if an object is encountered in between then door takes 3 attempts to close the door and even after attempting, if the door is still not closed then Train Operator again tries to close the door and after all the unsuccessful attempts the door has to be closed by cutting the switch near door as it is door must be closed properly before operating train.

SIGNALING AND TELECOMMUNICATION

The Jaipur Metro uses cab signaling along with a centralized automatic train control system consisting of Automatic Train Protection and automatic train signaling modules. Jaipur Metro has proposed that it will have automatic train operation also in future. A 380 MHz digital trunked TETRA radio communication system from Cascadian is used on all lines to carry both voice and data information. An integrated system comprising optical fiber cable, on-train radio, CCTV, and a centralized clock and public address system is used for telecommunication during train operations as well as emergencies.

OPERATIONS

Trains operate at a frequency of 10 to 15 minutes between 6:45 and 21:00 depending peak and off-peak time. Trains operating within the network typically travel at speed up to 40 km/h (25 mph), and stop for about 20–40 seconds at each station. Automated station announcements are recorded in Hindi and English. Many stations have services such as Parking lot, ATMs and mobile recharge. Eating, drinking, smoking, and chewing of gum are prohibited in the entire system. The metro also has a sophisticated fire alarm system for advance warning in emergencies, and fire retardant material is used in trains as well as on the premises of stations. Navigation information will sooner be available on Google Transit. The first coach of every train is reserved for women.

SECURITY

The responsibility of security of Jaipur Metro has been entrusted to Rajasthan Police. Strength of 789 police personnel has been sanctioned for security and policing of Jaipur Metro. Latest security equipments have been provided at all Metro Stations. Closed-circuit cameras are used to monitor trains and stations, and feed from these is monitored by Rajasthan Police and Jaipur Metro authorities at their respective control rooms. In addition metal detectors, X-ray baggage inspection systems. Each of the underground stations has about 45 to 50 cameras installed while the elevated stations have about 16 to 20 cameras each. The monitoring of these cameras is done by the Rajasthan Police, which is in charge of security of the Metro, as well as the Jaipur Metro Rail Corporation. Intercoms are provided in each train car for emergency communication between the passengers and the train operator. Periodic security drills are carried out at stations and on trains to ensure preparedness of security agencies in emergency situations.

SCADA FOR OPERATION

Supervisory control and data acquisition (SCADA) is a control system architecture that uses computers, networked data communications and graphical user interfaces for high-level process supervisory management, but uses other peripheral devices such as programmable logic

controllers and discrete PID controllers to interface to the process plant or machinery. The operator interfaces which enable monitoring and the issuing of process commands, such as controller set point changes, are handled through the SCADA supervisory computer system. However, the real-time control logic or controller calculations are performed by networked modules which connect to the field sensors and actuators.

TRAIN INTEGRATED MANAGEMENT SYSTEM (TIMS)

Train Integrated Management System (TIMS) is a train information system that performs continuous monitoring of control information in the driving cab and in instruments for monitoring as well as checks on train status to ease the burden on operators and conductors, to properly provide emergency information to the train crew and to streamline the checking procedure.

With integrated control of train-mounted devices using software logic and serial transmission, the system makes the train car system simpler and more reliable, establishing an optimal train car system.

Integrated train car management function

• Overall train control (optimal control)

Optimal powering and braking depending on the loading conditions of the entire train

Effects: Effective use of regenerative braking equipment, enhanced response to speed control, compensation for the braking strength of the whole train at times of brake failure

• Response confirmation function

Control for initiation/termination of train car operation (with pantographs up/down - SIV on/off - lighting and air conditioning on/off)

Effects: Improved safety of control and easier detection of causes of failure

• Safety interlock

Thorough check on conditions for activation of doors, brake failure, operation of safety brakes in response to powering commands

Effects: Minute safety functions that cannot be provided by hardware can be supported by software logic.

Approval Letter from Organization

To,

The Principal

JECRC, Jaipur

Sub- Bus Permission for Industrial visit

Respected Sir,

A group of 40 students is proposed to go for an Industrial visit in Jaipur Metro Rail Corporation (JMRC, Jaipur) on 17th January 2017.

Departure from college 9:00 AM

3:30 PM Return to College

You are requested to Kindly provide one bus for the industrial visit (9:00AM to 3:30pm).

Regards 41112217 Gajendra Sharma

Asst. Prof. CSE

Coordinator Industrial visit

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Visit Picture





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fand ... Head of the Department Computer Science & Engineering JECRC, Jaipur