



Seremban – Gemas Electrified Double Track Project, Malaysia

Electrification Works at a Glance...

Electrification, the need of time.....



Aerial view of Rembau FS

The need for efficient, eco-friendly and well-integrated public transport and mass rapid transit is greater and more urgent than ever. In the past 36 years, Ircon is executing the railway electrification projects in India and abroad to meet the increasing demands of commutation.

With in-house design, OCS, EHV sub stations and Power SCADA works in SGEDT Malaysia projects, IRCON has turned up as a turnkey contractor of 25 kV Railway Electrification.

High Speed Efficient Rail designs



Sungai Gadut Station

SGEDT, Malaysia OCS is designed for the maximum speed of 160 KMPH and to meet the KTMB operation calendar of year 2037. The design has been based on the pantograph dynamics of the Catenary system at the maximum speed and incorporating the European standards to derive the various OCS parameters.

The simulation studies has also been performed to derive the Substation spacing, Transformer sizes, Conductor sizes and Line resonance due to system harmonics to ensure the reliability of the system. With EMF simulation studies on Petronas (Gas) pipelines crossing and other systems, exposed for Electric Interference, a Booster Transformer Systems has been given to meet the exact needs of Customer.

Mechanized Working

Cantilever Erection



With a highly equipped machineries and efficient OCS manpower (able to work even in extreme weather conditions), Ircon is pioneer in delivering the project on time. Ircon boasts a well trained OCS skilled manpower team and sophisticated German machineries, which outclass it from others in the field of Railways construction.

With a firm QA/QC procedures the conformity of the deliverables are given the utmost importance. The Execution of OCS work was done on the fixed coordinate plans to enhance the productivity and making possible the parallel execution of OCS and Track Works.



OCS Pole Concreting



Ircon implemented absolute mechanized working for the OCS foundation works, therefore minimizing the manpower requirement. The usage of sophisticated machineries led to higher productivity and accuracy. With RRVs capable of moving on track and on road, the major constraints of access were resolved to a large extent.

EHV Substations

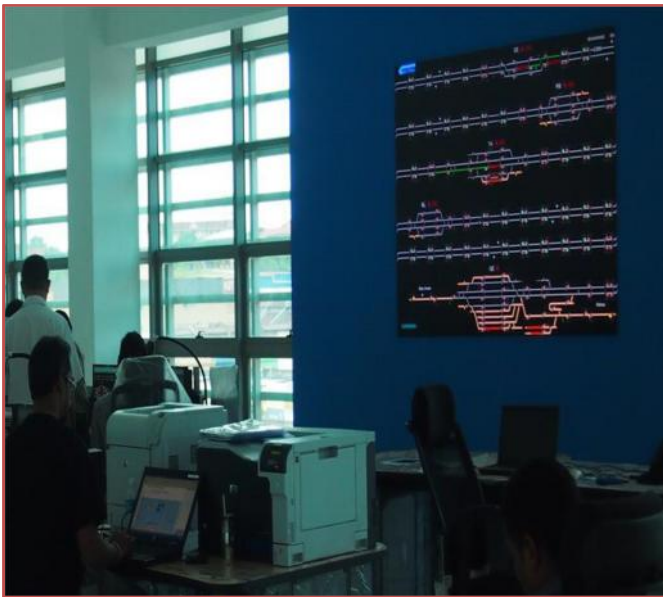


Batang Melaka FS 132 kV Bay

Ironcon has conducted Simulation studies of Voltage Change, Phase change and Harmonics on Incoming 132 kV grid of TNB and designed the optimized substations. The efficient protection system with switchgears and sectioning ensures the reliability of the system.

The 25 kV switchgear systems have been made indoor type with short circuit rating of 6000A at 25 kV. When it comes to the protection functions, European norms have been followed to ensure the constant power in to the Overhead Contact line.

Power SCADA System



CTC Gemas

SCADA refers to the combination of Telemetry and Data acquisition. A new mirrored remote control centre of the existing centre at KL central has been provided at Gemas, such that failure of one centre does not affect the operation of others. The redundancy in communication is the major feature of the system.

The SCADA system equipments are designed to report any change of occurrence within the 5 seconds of event occurring. The system is capable of extension by a further 20 substations.

Harmonic Dampers



Harmonic Damper at Rembau

Harmonic Dampers (Low pass filter of 1st order) are introduced for the first time in the history of Malaysian Railways. The filters are designed to avoid the line resonance and consequent faults to make the system highly reliable. Ircon has given the utmost priority to give a system with minimal maintenance requirement. The RC type filters are lower in costs and moderate in energy consumption.

Architecture Friendly Design

With in-house design team, the OCS has been designed considering the architectural beauty



Gemas Station Platform



Sungai Gadut Station Platform

Machineries

With an eye on higher quality and speedy OCS working, Ircon possess sophisticated machineries (mostly German made) in its OCS construction and maintenance M & P fleet. Ircon owns 4 self-propelled Rail cum Road Vehicles (RRVs), 1 Wiring train, 1 OCS inspection car, 1 Motor Trolley and Flat Wagons worth \$3.37 million (INR 211 million). With various constraints encountered in OCS working, each machine was strategically procured in Ircon's machinery fleet. There highlights are:

A. Rail Cum Road Vehicles (RRVs): The usage of RRVs expedites the productivity with less manpower and resolves the prominent problem of access points in Railways working.

RRV 1



Equipped with

1. *Hydraulic Crane*
2. *Workman basket*
3. *Auger*
4. *Pantograph*

RRV 2



Equipped with

1. *Hydraulic Crane*
2. *Workman basket*
3. *Auger*
4. *Moving Platform*

RRV3



Equipped with

1. *Drum Stand*
2. *Pantograph*
3. *Data Logger*

RRV 4



Equipped with

- 1. Concrete Mixer*
- 2. Movable platform*

B. Rail Vehicles: The high speed rail vehicles are majorly used in wiring and post wiring works. These high speed machines with automated control working led to speedy, smooth and reliable working in a limited time frame of Traffic & Power blocks (Isolation). With real time simulation on a laptop in a moving inspection car the OCS inspection, maintenance and analysis have become effortless.

Inspection Car



Equipped with

- 1. Catenary Measuring Device (Real Time Simulation)*
- 2. Movable Platform*

Wiring Train



Equipped with

- 1. Reel Wagon (auto unrolling)*
- 2. Deck Coaches*

Motor Trolley



1.

Equipped with

1. *Crane*
2. *Flat Trolley*

Flat Wagons



Equipped with

Flat Wagons of 64 ton Capacity.

System Maintenance and Trainings



Spring type kink Remover, to smoothen the Contact Wire profile

After successful commissioning of the Seremban - Gemas project, the maintenance works is in progress.

The maintenance is being done with standard maintenance schedule. This includes monthly, quarterly, half yearly and annual inspection of Catenary in isolations/outages.



Neutral Section Checking at Rembau

To make the customer fully acquaint with the System, In house and overseas training to KTMB Electrical operation staffs has also been arranged.

With our qualified expertise in Simulation, Design and Execution, our highlights of major expertise are:

- 25 kV AC OCS (Overhead Catenary System).
- EHV Substations/ Traction Substations, Harmonic Dampers.
- Power SCADA system and Communication.
- Operation and Maintenance of the complete System.

Acronyms

- *SGEDT - Seremban Gemas Electrified Double Track*
- *OCS - Overhead Catenary System*
- *EHV - Extra High Voltage*
- *FS - Feeder Station*
- *SCADA System - Supervisory Control and Data Acquisition System*
- *EMF - Electro Magnetic Field*
- *RRV - Rail cum Road Vehicle*
- *KTMB - Keretapi Tanah Melayu Berhad (Malaysian National Railways)*
- *TNB - Tenaga Nasional Berhad (Malaysian National Power Corporation)*
- *KL - Kuala Lumpur*
- *RC Filter - Resistive Capacitive Filter*

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