Talk on Distribution Automation Project

by Dr Siow Chun Lim

Dr Siow Chun Lim is currently a General Committee in Electrical Engineering Technical Division (EETD).

On 3rd November 2018, the Electrical Engineering Technical Division (EETD) has organised a talk on Distribution Automation Project. The speaker was Tuan Haji Rosli (TNB) which has more than 30 years of experience within the power distribution automation field. The talk was attended by more than 40 participants.

Tuan Haji started his presentation by providing a brief introduction to TNB Distribution network. Some interesting information was presented as below:

Distribution Network Data	**Unit**
Distribution customers	8.5 million
Main intake stations	490
Distribution main intake station	770
Main switching stations 33kV	290
Main switching stations 11kV	3,000
Distribution substations	74,500
Distribution transformers	79,000
Medium voltage overhead	41,000 km
Medium voltage underground	435,000 km
Low voltage overhead	507,000 km
Low voltage underground	340,000 km

Next, the SAIDI index was introduced. SAIDI which stands for System Average Interruption Duration Index provides an overview of the average times in minutes per customer experience outages in a month or a year. Developed mega city such as Tokyo has an impressive SAIDI of 10 minutes. Yet, TNB's SAIDI has improved from 600 minutes in 1998 to 50 minutes two decades later. This significant improvement may be attributed to the automation of power distribution. Distribution Automation (DA) is an initiative under TNB to enable control centre to execute faster restoration during outages. This is done by equipping substations with remote monitoring or control facility such as SCADA which stands for Supervisory Control And Data Acquisition. DA is being implemented in the whole peninsular Malaysia. There are four key drivers behind DA namely reduction of SAIDI and frequency of accident as well as enhancement of customer satisfaction level and operational efficiency.

A complete DA system consists of the plant (substation), communication system and master system or human machine interface (HMI). The main components of DA installation include remote control box, vacuum circuit breaker (VCB) or motorised Ring Main Unit (RMU), fault indicator, remote terminal

unit and front terminal unit. The remote control box is a remote control facility for authorised personnel at site. VCB/RMU is an interrupter in the electric circuit to prevent fault current which is detectable by the earth fault indicator which then remotely reports it in medium voltage distribution networks. Remote terminal unit is a device which receives information from the plant and then relays the signal to the Master System.

The speaker then introduced several packages of fully automated restoration system that TNB has to offer namely A-11, B-11 and C-11. The A-11 package is equipped with Automated Transfer Switch (ATS) and is able to restore power within 1 minute. Hence it is typically used in very sensitive zones which require the highest level of supply security. B-11 can do so within 15 minutes while C-11 within 60 minutes.

The communication system for DA has also undergone evolution from GPRS network to single-SIM and dual-SIM 3G/4G network solution. Satellite technology may also be employed but usually only at remote area due to its cost.

Tuan Haji concluded his presentation by highlighting several key points. DA initiative will transform the landscape of the electrical industry in Malaysia. Besides faster restoration time, operational efficiency and customer satisfaction can also be improved. With improved customers' experience, productivity may be increased and this is vital to enhance Malaysia's ability to attract more foreign investments into the country.

After his presentation, the participants were engaged in a kahoot online quiz where the top five winners walked away with prizes courtesy of TNB. A token of appreciation was then presented by EETD to Tuan Haji. The session ended with all participants experiencing the Distribution Automation virtually by using the DIVE simulator.

Participants experiencing the DIVE simulator

Group photo of all participants