IEC 60364-8-1 Energy Efficiency – Part 1

by Dr Siow Chun Lim

Dr Siow Chun Lim is currently the Secretary/Treasurer in Electrical Engineering Technical Division (EETD).

On 10th October 2019, the IEM Electrical Engineering Technical Division has organized a half-day seminar on IEC 60364-8-1 Energy Efficiency. The speaker is Mr. Philippe Vollet, IEC Energy Efficiency Officer, IEC SC23K Secretary. He started with brief introduction on the overview of IEC 60364 ranging from its history all the way to Parts 1-7. He commented that Part 6 may be updated soon due to the digitalization era which may be strongly applicable in verification of installation. IEC 60364 started off as an answer to the escalating fire risk due to electricity while the IEC TC64 was established in 1967 with a task of safety pilot in the field of the protection against electric shocks. However, the first series in UK, Germany, France and USA were established earlier than IEC TC64. TC64 comprises of 37 Permanent Members including Malaysia with 15 Observer Members and 19 Affiliate Members. More than 150 experts from national committees, electrical contractors, laboratories, universities and doctors and electrical equipment manufacturers formed the committee.

IEC 60364 comprises of Part 1 (compliance to product standard, earthing systems and separate circuits), Part 4 (protection and safety), Part 5 (device selection), Part 6 (verification), Part 7 (special locations) and Part 8 (energy efficiency and smart grid installations). Part 1 does not apply to systems for distribution of energy to the public or transmission for such systems as well as equipment apart from their selection and installation conditions. It is applicable to fixed installations with supply voltages up to 1kV (AC) and 1.5kV (DC). Types of earthing systems include TT, IT, TN (AC) and TN (DC). Every item of electrical equipment used in electrical installations shall comply with such IEC standards as are appropriate. Every installation shall be divided into circuits to avoid danger and minimize inconvenience in the event of fault, facilitate safe inspection, testing and maintenance, take account of danger that may arise from failure of a single circuit such as lighting circuit, reduce unwanted tripping of RCD due to excessive PE conductor currents not due to fault, mitigate effects of EMI and prevent indirect energizing of a circuit intended to be isolated.

Part 4 covers fundamental principle, usual protective measures and additional protection. Fundamental rules for protection includes basic protection under single fault conditions, fault protection and additional protection. Hazardous live parts shall not be accessible and accessible conductive parts shall not be hazardous. Fault protective measures include automatic disconnection of supply, double or reinforced insulation, electrical separation and safety extra low voltage (below 50V). in terms of additional protection, protection with 30 mA Residual Current Device (RCD) is compulsory against direct contacts, socket outlet circuits up to 32 A and even for lighting circuits in dwelling (new). Protection against fire and arcs caused by electrical equipment can be offered by AFDD (Arc Fault Detection Devices), precautions where particular risk of fire exist is by 300 mA RC protection and protection against burns which impose

temperature limits in normal service for accessible parts of equipment. Arc fault may occur due to leakage current flowing in damaged insulation, damage to conductor or loose connection. These happens due to ageing, lack of maintenance, poor connections, aggressive environment, vibrations, humidity, rodents, misuse, overloaded multiple socket and trapped cables in door. Electric arc, carbonization and availability of current path are essential components which causes electrical fire. Use of AFDD is recommended in premises with sleeping accommodations such as bedrooms in residential and hotels, in locations with risk of fire due to nature of processed or stored materials such as warehouse, with combustible constructional materials such as wooden buildings, in fire propagating structures such as high rise buildings and in locations with endangering of irreplaceable goods such as museums. AFDD shall be installed at the origin of the final circuit to be protected in the switchboard. AFDD shall comply with IEC 62606 to promote conformity marks.

Part 5 involves selection of RCD, SPD, AFDD and coordination of protective devices. In Part 6, it is recommended for verification to be done every 4 years for general case and 10 years for dwellings. New TC64 projects include stationary secondary batteries, operation of prosumer's electrical installations, and DC power distribution over IT Cable Infrastructure, DC Data Centers (IEC 60364-7-720), application guide for residential electrical installation in DC not intended to be connected to Public Distribution Network (IEC TS 61200-102), and application guide for motors, lighting, UPS, rotating generators and source changeover (IEC TS 61200-2X). Several parts are also undergoing revision.

The seminar then paused for a coffee break and a group photo