



Talk on “Selectivity in UPS Installation”

by Dr Siow Chun Lim

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On 28th August 2017, a technical talk on “Selectivity in UPS Installation” was successfully organised by the IEM Electrical Engineering Technical Division (EETD) at Wisma IEM. Attended by 30 participants, this talk was delivered by Mr. Jorge Aguinaga, Senior Product Line Manager in Eaton's Critical Power Systems Division. Uninterruptible Power System (UPS) is a key component in critical electrical installation such as hospitals and data centers. It is crucial for practicing engineers engaged with UPS installations to understand the principles of IEC 60364 to ensure aspects such as connections and earthing are sufficiently provisioned for. Nonetheless, variations as per national codes should also be considered. However, the main referenced standard for UPS should be IEC 62040.

Mr. Jorge then explained on behaviour of UPS during overload and short-circuit condition. The understanding of rated short-time withstand current and rated conditional short circuit current is crucial to ensure appropriate selectivity in UPS installation. The UPS has to be properly coordinated with the upstream and the downstream. Modular UPS, which is the conventional type today, offers flexibility in terms of personalisation of power needs. Note that when it comes to UPS installation, optimisation of cost and space is of prime concern. Ideally, one would want more output power for less installation space. With the advancement of technology in UPS, it is typical for the inverter to be self-protecting from overcurrent. If fault is unable to be cleared within the specified time, the inverter can be programmed to trip off. During short circuit condition, an inverter acts as a current source. It is expected to feed as much current as required to produce reference voltage to output, limited by current limit. Fault impedance should have minimal effect on the current fed by the inverter.



Mr. Jorge Aguinaga delivering his talk

When it comes to bypass system, it can either be centralised or distributed with each having its own advantages and applications. The static bypass switch is made of thyristors also known as silicone

controlled rectifiers (SCR). This semiconductor device have limited current carrying capacity which depends on factors such as limited short term overload capacity, limited surge current capability, let through energy and rupture current. Proper selection of fuse to protect the SCR from failure is vital and in order to achieve that, knowledge on pre-arcing time and arcing time of fuse is required.

In conclusion, the very purpose of installing a UPS is to have a reliable power supply for critical loads. The fundamental principles of safety must be acquired and the minimum requirement such as automatic disconnection of supply, operating voltages, back-feed protection and short-circuit levels must be adhered to. Once safety requirement is fulfilled, the functionality of the system such as selectivity, electromagnetic compatibility, resilience, efficiency and maintainability shall be the next priority. Both IEC 60364 and IEC 62040 shall be adhered to ensure safety and reliability for power distribution with UPS installations.



Participant interacting with the speaker



Session chair presenting a token of appreciation to the speaker