



Workshop on Testing, Certification and Compliance Verification for Busbar Trunking Systems (busways)

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On 26th June 2018, the IEM Electrical Engineering Technical Division (EETD) has successfully organised a one-day workshop on testing, certification and compliance verification for busbar trunking systems or also known as busways at Wisma IEM. There were 2 speakers namely Mr. Chandra Kumar and Mr. Bryan L. Tatum. The seminar was attended by more than 50 participants.

The first speaker was Mr. Chandra Kumar. His presentation was centred around IEC 61439 part 6 which is specifically on bus trunking systems as part of the low-voltage switchgear and controlgear assemblies. He started off by giving a brief introduction of the objectives of IEC which is to establish standards in collaboration with national committees with safety and performance as the key principles. It aims to achieve worldwide usage of standards through harmonisation initiatives.

According to Mr. Chandra Kumar, most countries adopts IEC standards with the North American region as an exception as the latter is based on UL standards for testing. IEC 60439 is established to set safety and performance levels of the products covered by the standard. It has to manage user and stakeholder expectations. However, it lacks the depth for many of the products to which it was being applied. The evolution and structure of these standards did not kept pace with the products and their application. In 1998, IEC recognised these shortcomings and restructure IEC 60439. In most countries today, IEC 61439 series is the most logical route to demonstrating safety compliance of assemblies/ low voltage directive. Demonstration of safety compliance is now made more flexible with the available of alternatives such as verification by type tests on the assembly, verification by comparison with a tested reference design based on known test data and specific set of conditions or verification by assessment which is achieved by satisfying design rules with correct application of calculations and design rules including appropriate safety margins.

IEC 61439 is also clearer in the scope and definitions. This standard applies to all assemblies irrespective of whether they are in the design, manufacturing or verification stage. Original and assembly manufacturer are clearly differentiated. Original manufacturer carries out the original design and the associated verification of an assembly in accordance with the relevant assembly standard. Assembly manufacture takes the responsibility for the completed assembly.

He then shared on the different parts of IEC 61439. Part 1 basically defines the general rules and states the service conditions, construction requirements, technical characteristics and verification requirements for low-voltage switchgear and controlgear assemblies. IEC61439-2 defines the specific requirements of power switchgear and controlgear assemblies. Part 3 defines the specific requirements for distribution boards intended to be operated by ordinary persons while part 4 is mainly on particular requirements for assemblies for construction sites. Part 5 is on public electricity network distribution assemblies whereas part 6 lays down the service conditions, construction requirements, technical characteristics and verification requirements for low voltage bus trunking systems (BTS). Other standards such as IEC 61921, IEC 62208 and IEC 60529 are also commonly cross-referenced with IEC 61439 as IEC 61439 is actually an assembly standard. The scope of IEC 61439-6 is limited for BTS for which the rated voltage does not exceed 1000V ac and 1500 Vdc.

Once the characteristics and ratings of the assembly or busways are defined, the design verification can begin. Some of the characteristics in Table D1 is non-existent in IEC 60439 such as strength of material and corrosion resistance. Resistance against corrosion can be done via damp heat cycling (IEC 60068-2-30) and salt spray test (IEC 60068-2-11). Glow wire test is recommended to be done first before going for short circuit test. Mechanical impact is done as per IEC 62262. Mr Chandra also explained on the code letters of the characteristic numeral for degree of protection of enclosures.

Mr. Chandra concluded by stating that global market access requires global compliance to global standards.

After the lunch break, Mr. Bryan L. Tatum delivered his talk on UL857 for busways. He started off by giving an overview on the product safety certification marks in North America. He pointed ou the purpose and use of national electric code.

He added that the Underwriters Laboratories Inc. (UL) is an independent product safety certification organisation which has been testing products and writing standards for safety over 120 years. UL listing mark indicates that the equipment meets the applicable safety requirements.

Typical LV equipment are busways, busway fittings, circuit breakers, insulated wires and enclosures. Components for use within a complete end product or system may be incomplete and typically have restrictions on performance and use. UL common recognised components are plastics/polymeric, standoff insulators/supports, terminal blocks/terminals and insulation materials.

Figures below summarise the aforementioned workshop



Figure 1: The participants



Figure 2: Token of appreciation being presented to the first speaker



Figure 3: Token of appreciation being presented to the second speaker