SECURITY AND LIFESPAN IMPROVE THE PERFORMANCES OF HV/LV TRANSFORMER SUBSTATIONS

[This presentation describes the manner in which the implementation of a corporate approach from design to end-of-life cycle, combined with changes in the regulatory environment, effectively contributes to improving the safety and lifespan of prefabricated transformer substations. A reminder of functional schema presented during the CIRED 2003 Conference will be done. It shows the main focus areas of our transformer substation development division’s activities over the past years. The design work associated with each focus area effectively contributes to improving the performance of the final product and to satisfying increased customer requirements in terms of safety, lifespan and environmental issues. Safety aspect will be presented from the design stage to the end-of-life cycle, following the IEC standard 62271-202. The product design must ensure voltage control to prevent inadmissible voltage levels in all accessible substation components or associated equipment components. The choice of adequate degree of protection level is essential for preventing premature product ageing. Equipment rooms and transformer rooms must be separated because they require completely different protection levels. The internal mechanical stresses to which the product is exposed are validated through testing, but stresses dependent on external phenomena need to be correctly identified and specified based on transport and operating conditions. Maximum temperatures are rapidly reached as soon as hot climates associated with intrinsic equipment thermal properties are taken into consideration, hence the need to supplement simulations with artificial irradiance tests. Regarding the lifespan of prefabricated substations, we have successfully completed the liquid dielectric transformer ageing studies presented during the last CIRED Conference, up to an example adapted to a photovoltaic step up transformer substation, justifying the crossed use with a climatic database which will be followed by the conclusion.]