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# JICABLE'07
# Rapporteur's Session Report

## A.3 SESSION : CABLES FOR THE FUTURE

Chairman : Jean Luc PARPAL, HYDRO-QUEBEC - Canada
Rapporteur : Christian AUCOURT, RTE – France

*This session « Cable for the Future » was focused on two new technological solutions to solve power transmissions issues : High Temperature Superconductor (HTS) systems and Gas Insulated Transmission Lines (GIL).*

Four of the presented papers are about HTS Cable Technology and address transmission issues through ampacity increase (presently up to 3000 A) while two papers presented technological improvements of GIL for future extra high voltage applications.

Paper A3.1 was an excellent introduction of HTS cable technology. First and second generation material of superconducting tapes with the performance limit achieve today were presented. The authors made a good summary of the advantages and the limitations of warm or cold dielectric designs.

Paper A3.2 was a very good presentation about a project, introducing an HTS triaxial cold dielectric cable. The authors presented in details the different steps of the installation : cable pulling of the cryostat, the preparation of the accessories, the first cool down, the electrical tests, the unplanned warm-up, the second cool down and finally the energizing of the HTS cable system in August 2006 in Columbus (Ohio).

Paper A3.3 was a very interesting presentation of a planed long distance (6 km) HTS cable in Amsterdam. The proposed project is an example of the potential of HTS system as a practical retrofit solution for transmission capacity in very crowded downtowns. Special cooling system installed at both ends of the cables was designed to insure a good operation in all conditions. The triax HTS technology (50 kV – 250 MVA) would be pulled in the existing steel pipe of the former external gas pressure oil filled cables.

Paper A3.4 was a very interesting presentation of the installation of a 138 kV transmission HTS cable system. The three monophase cold dielectric cables connect two substations distanced 600 meters apart and the whole design is designed to withstand fault currents up to 51 kA rms. The refrigeration system was designed and tested for 65 °K temperature and 18 bar pressure operation.

With these 4 papers, HTS system becomes a network reality in some specific applications.

Paper A3.5 is a very good paper about the development of the Gas Insulated Lines technology by increasing the dielectric performance of GIL under N2 and SF6 by applying a dielectric coating on the conductor. This design reduces the risk of dielectric failure. In such case the time of repair is a limiting factor for the implantation of GIL technology. The paper presents results about N2 insulation with different types of coating material, under lightning and switching impulse conditions.

Paper A3.6 is an interesting paper about a future installation of GIL in a tunnel for an extension hydro power plant in Austria. The paper describes the advantages of the GIL technology : modular design, large ampacity, maximum staff safety in a gallery, less affected to fire, no electromagnetic field and shows an industrial solution using N2/SF6 mixture.

These 2 last papers demonstrate that GIL is a proven technology for high power transmission system and could be an alternative to conventional cables (XLPE, …) for such specific installations.