The SuperOx group of companies is a supplier of customised 2G HTS wire. At present, the wire is manufactured jointly by SuperOx in Moscow and SuperOx Japan LLC in Tokyo.

Ultimately, independent full production cycles will be established at both locations. SuperOx 2G HTS wire has successfully qualified for high current operation at 4.2 K in 20 T magnetic field, as targeted by CERN’s magnet development programme. An internal R&D effort is under way at SuperOx, to improve further in-field performance of the wire.

Going beyond the material production, SuperOx has been integrating 2G HTS wire into HTS devices. Particularly relevant to the FCC magnets and power infrastructure safety and efficiency are our HTS cable and fault current limiter development activities.

We have established production capabilities for HTS Roebel cables, the conductors of choice to wind HTS inserts into 21 T dipole magnets. We have implemented the advanced “Punch-and-Coat” approach to making Roebel cables, resulting in much more mechanically stable cables than the conventional HTS Roebel cables. In the novel approach, Roebel cable strands are punched from silver-coated 2G HTS wire and subsequently electroplated with a surround copper stabilising layer. As a result, the wire architecture, along the entire strand, is fully encased in copper and is thus protected from delamination. The copper coating, added after punching, smoothens the punching burr on the substrate, making it no hazard for the adjacent strands.

In consortium with Russian Cable R&D Institute (VNIIKP), an ITER supplier, SuperOx is bidding to supply both the 2G HTS and MgB2 sections of the superconducting link cables for the LHC upgrade. Similar cables are seen as an important part of the FCC energy infrastructure.

SuperOx has been developing and marketing low-, medium- and high-voltage superconducting fault current limiters, and is offering these to contribute to the energy efficiency and safety of FCC.

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