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Wed-Mo-Po.09-01: Trial fabrication report on twisted and simply stacked HTS cable by using individual equipment

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As HTS(high-temperature superconducting) cables emerge as a potential alternative to drive inno- vation in the power sector, we are building equipment that can produce various types of cables. In particular, as research on various types of conductors using REBCO based tape-type superconduc- tors becomes more active, we are manufacturing equipment that can produce cables with twisted and transposed structure and simply-stacked structure.
(Twisted and transposed cable) We are analyzing the technology required to manufacture cable with twisted and transposed structure, and are making manufacturing equipment that reflects the technology. First, the cable to be manufactured using the equipment is wound in a spiral shape around a circular former using HTS tape at a winding angle selected according to the cable design value. The former is selected as litz wire and wound with nomex tape for a smoothing layer so that it can be used for manufacturing long cables and for equipment(flexibility). The former wound on the Litz wire bobbin moves to the cable bobbin, with four tapes wound in the first layer (section 1, winding clockwise), and then in the second layer (section 2, winding counterclockwise). 2 layer are wound in one motion, and this motion can be repeated to manufacture cables with multiple layers. Based on various studies, we will further upgrade our manufacturing equipment.
(Simply stacked cable) Also, semi-automated multiple-layer HTS tape stacking equipment is man- ufactured. The pulling tension required for each tape during stacking is controlled manually by using the frictional force of a metal block on the tape's spool axle. Trench type guide rollers are installed to align each HTS tape, and the aligned tapes creates a cable bundle. With a bundle pro- cessor, stacked HTS tapes are wrapped with narrow-width metal foil, pressed and go through a series of processes(jacketing) for cable manufacturing. and then pressed.

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