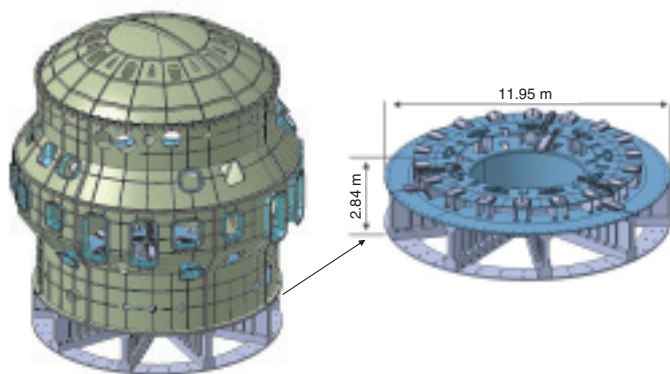
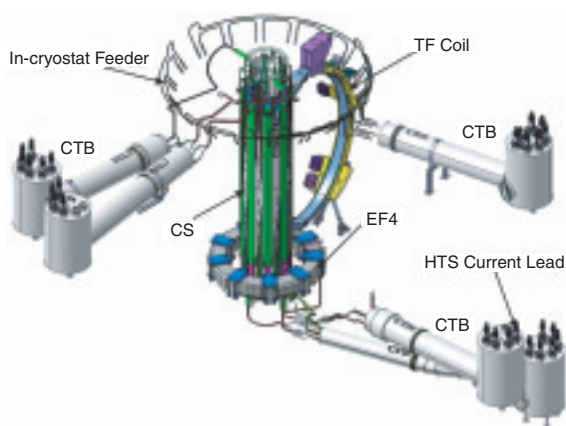


## 4-6 Progress in Satellite Tokamak Programme Project — Construction Activities of JT-60SA Tokamak Progressing toward Assembly —



**Fig.4-14 Bird's eye view of cryostat and cryostat base**

The left image shows the cryostat vessel body and the cryostat base. The right image shows the dimensional confirmation test for the 120° sector of the lower structure of the cryostat base.

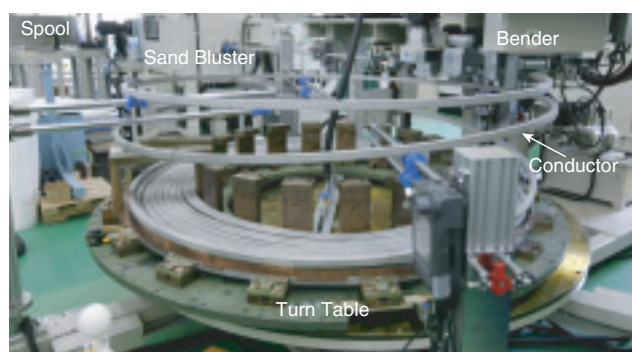


**Fig.4-15 Bird's eye view of feeder system design**

The structure of the feeder system connecting the coil terminal box (CTB), the high temperature superconducting current lead (HTS-CL), and the superconducting coils (TF coil, CS, and EF4).

For the Satellite Tokamak Programme, jointly implemented by Europe and Japan, construction of the JT-60SA progressed well; this includes designing and manufacturing of components. Newly concluded were the Procurement Arrangements (PAs) for the cryostat base assembly and the remote handling equipment for welding and cutting, which are to be contributed by Japan. PAs were also concluded for the superconducting toroidal field (TF) coil test, which is to be contributed by Europe. A total of 18 PAs were concluded by February 2012 between the two Implementing Agencies (IAs), the Japan Atomic Energy Agency (JAEA) for Japan and Fusion for Energy for Europe.

For the cryostat base to be contributed by Europe, welding of the lower structure sectors (three 120° sectors) was completed. After passing dimensional confirmation tests (Fig.4-14), highly precise machining, which finishes surfaces within  $\pm 0.5$  mm, was started. As for the TF coil, the contract for coil manufacturing was awarded in 2011 following the



**Fig.4-16 Central solenoid manufacturing**

Winding test for the central solenoid using a copper dummy conductor.

contract of the NbTi strand in 2010. Furthermore, the contract of the quench protection circuits for the superconducting coils was also awarded and its detailed design was completed.

For the vacuum vessel (VV) to be contributed by Japan, the third 40° sector was completed at the JAEA Naka site. Regarding the poloidal field coils, the equilibrium field coil No.4 (EF4), which is to be installed in the lowest part of the tokamak, was delivered to the Naka site. A feeder system was designed to connect the coil terminal (CTB), the high temperature superconducting current lead (HTS-CL), and the superconducting coils (TF coil, CS, and EF4) (Fig.4-15). As for the CS with the Nb<sub>3</sub>Sn conductors, its winding test was started using copper dummy conductors (Fig.4-16).

In addition, the disassembly of JT-60 at the Naka site is progressing well and is on schedule. All these activities are taking us toward the assembly of JT-60SA, which will be started in January 2013.

### Reference

Yoshida, K. et al., The Manufacturing of the Superconducting Magnet System for the JT-60SA, IEEE Transactions on Applied Superconductivity, vol.22, issue 3, 2012, p.4200304-1-4200304-4.