JT-60SA Newsletter No.26, 29 February 2012



Headline

PF coil manufacturing making progress



EF4 pancake stack

For the equilibrium field coil No.4 (EF4), resin applied for the completed ten pancakes was thoroughly cured, and the pancakes have been stacked to form the EF4 itself. Tools to be used for manufacturing of the EF5 and EF6 after the completion of the EF4 were delivered to the Naka site. For the central solenoid (CS), adjustment of heat treatment for the Nb₃Sn conductor was started, with the dummy pancakes in a heat treatment support jig, by putting them into a retort container.



Heat treatment support jig containing dummy pancakes

<u>News</u>

Fabrication of third 40° sector of vacuum vessel in progress



Welding of two 20° outboard segments

Welding of the upper and lower inboard segments for the third 40° sector of <u>the vacuum vessel</u> was finished, and the two 20° outboard segments are now being welded, and will be completed by the end of February at the company's factory in Japan. After the delivery of the inboard and outboard segments to the Naka site in March, they will be jointed at the site, and the third 40° sector is expected to be completed by the end of March.

<u>News</u>

Disassembly and reassembly of toroidal field coils progressing smoothly



Disassembly of toroidal field coils in torus hall

<u>The toroidal field coil</u> is the heaviest item as a single unit, and weighs 90 t. In spite of this, removal of the coils has been making very steady progress, and eight of eighteen coils were already removed by the end of January. Seven of them were transported from the torus hall to the storage building, and reassembled in the form of a torus.



Reassembled toroidal field coils in storage building

News

Completion of type tests on dump resistor prototypes of QPC



Simplified scheme of the Quench Protection Circuits (right) and one of the dump resistor cubicles (left)

The contract activities for the realization of the Quench Protection Circuits (QPC) are progressing very well; the system is being procured by the Italian National Research Council, acting through Consorzio RFX, via a contract awarded to the company Ansaldo Sistemi Industriali (ASI) in December 2010.

The manufacturing of the QPC prototypes started after the conclusion of the design phase in July 2011; today the majority of the main components have been realized and tested. In February 2012, the type tests on the QPC dump resistor prototypes, manufactured by the company Telema, subcontractor of ASI, were executed at the factory premises, located in Piacenza, Italy.

All the specified tests have been performed: measurement of the nominal resistance, verification of the rated energy on a single module, electro-dynamic resistance test, seismic tests, and voltage to ground withstand tests. The seismic test campaign, in particular, was very detailed and comprehensive. "Vibration and Shock tests" were very impressive; a cubicle with a weight of about 1.5 t was subjected to vibrations in all the three directions in a frequency range from 1 to 35 Hz and accelerations up to 2.2 m/s^2 .

The prototype of the dump resistor cubicle selected for these tests was that of the toroidal circuit QPC, because it is the largest and the heaviest among the QPC dump resistors. The test was performed with 2 vibrating tables "MOOG" (horizontal

and vertical), equipped with a "Laser" Control, able to test the component in 3 different ways:

- random mode for testing in random frequency vibrations
- swept sine mode
- classical shock with a half sine shape

All the tests were passed; from an accurate visual inspection, no damage or mechanical rupture appeared after the vibration and shock test.



Dump resistor cubicle on the vibration table during the Vibration and Shock tests in the three directions



Vibration tables for tests in horizontal and vertical directions (left), Telema team and representatives of ASI, Consorzio RFX and JAEA after the successful conclusion of the tests (right)

On top of the specified tests, additional ones to verify the rated energy on the whole resistor were performed; the cubicles were equipped with thermocouples to measure the temperature distribution, the temperature outside the frame and the hot air over them, and to check the duration of the cooling phase. The specification requirements were all well satisfied.



Test arrangement to verify the rated energy, with the position of the highest thermocouple highlighted (left), The participants in the tests (centre)

The JAEA technical responsible officer of the JT-60SA Power Supply and Control systems (right)

Pictures courtesy Telema/ ASI

News

Completion of JT-60SA Research Plan version 3



<u>The JT-60SA Research Plan (SARP)</u> is a document growing towards the first plasma and summarizes research objectives and strategy of JT-60SA experiments covering all the major research fields contributing to ITER and DEMO. Through an intensive and wide discussion between the EU and JA fusion communities after the completion of the SARP version 2.1, the SARP was updated to version 3 on 22 December 2011. This latest version is actually the collaborative product of JA and EU scientists. Its co-authors include 332 scientists in total; 145 from JA, 182 from EU and 5 from the Project Team.

The main points of the revision from the previous version are (i) a new reference scenario of "improved H-mode (so called Hybrid)" operation, (ii) case studies of future replacement of the carbon wall/divertor with a metal one, and (iii) a new chapter treating modelling and simulation studies.

The latest version of SARP is available on the JT-60SA Website.

Meetings



System integration of JT-60SA reported at DDA technical coordination meeting

In the framework of the Broader Approach activities, the Satellite Tokamak Programme (STP) has been collaborating with <u>DEMO Design Activity (DDA)</u> in order to share practical information for each project, and JT-60SA system integration has been reported for the first time at the 3rd Technical Coordination Meeting (TCM-3) of DDA and the 10th Workshop on DEMO R&D in the Broader Approach Activities.

The meeting and workshop were held at the University of Tokyo in Kashiwa on 1 - 3 February with 52 participants: 5 from the IFERC-Project Team, 24 from the JA home team including 1 by videoconference, 23 from the EU home team including 11 by videoconference. As part of the STP-DDA collaboration, 'the system integration of JT-60SA construction' was reported by K. Shibanuma, the assembly technical responsible officer from the STP. He explained the integration of the JT-60SA major tokamak components, in-vessel components, cryoline in the cryostat, common stages, and assembly activities in detail.

Integration of the whole DEMO system including its assembly was one of the key issues for the DDA, and information of the integration reported from the on-going JT-60SA project including issues and actions attracted much interest of the participants, who were getting engaged in the system integration in the DDA.

<u>Local</u>



Traditional Munich "Cooper's Dance" celebrated in Garching

To mark the retirement of the chair of its staff association the "Cooper's Dance" (see picture) was performed at F4E's host institute, the Max Planck Institut für Plasmaphysik in Garching, Germany on 20 January 2012. This traditional Munich dance can be traced back to the year 1517 after a period of plague (Black Death) had killed many citizens. In order to encourage the citizens to emerge from their homes and enjoy life again the Guild of Coopers went onto the streets and performed their dance. Since those ancient days this dance is repeated every seven years. It has become one of the most popular craftsmen traditions in Munich ever since.

Calendar

March 28, 2012 10th Meeting of <u>the STP Project Committee</u> (PC-10) Japan and EU (Remote) April 18-19, 2012 14th Technical Coordination Meeting (TCM-14) Naka, Japan

April 24, 2012 10th Meeting of <u>the BA Steering Committee</u> (SC-10) Naka, Japan

May 7-10, 2012 <u>17th Joint Workshop on Electron Cyclotron Emission and Electron Cyclotron Resonance Heating</u> Deurne, Netherlands

May 14-18, 2012 International Cryogenic Engineering Conference 24-International Cryogenic Materials Conference 2012 (CEC 24 - ICMC 2012) Fukuoka, Japan

July 2-6, 2012 <u>39th European Physical Society Conference on Plasma Physics & 16th International Congress on Plasma Physics</u> (EPS/ICPP) Stockholm, Sweden

Contact Us

The JT-60SA Newsletter is released monthly by the JT-60SA Project Team. Suggestions and comments are welcome and can be sent to <u>masayasu.sato@jt60sa.org</u>.

For more information please visit the website: http://www.jt60sa.org/