

Headline

QPCs delivered to Naka



Route of the ships transporting QPC components from Genoa to Yokohama



Movement of QPC containers at the port of Yokohama



Opening of container seal at Yokohama port before inspection

The quench protection circuits (QPCs) of JT-60SA, required for the protection of the poloidal and toroidal field superconducting magnets, have been delivered to Naka at the end of September 2014.

The 13 QPC units, procured by the Italian National Research Council acting through Consorzio RFX by means of a contract awarded to Nidec ASI S.p.A, had been packed in 72 wooden boxes stored in 17 containers. The containers had been loaded in a first container ship that left the port of Genoa (Italy) on 11 August. This ship passed through other European ports (Fos, Barcelona, Valencia), then crossed the Suez Canal reaching Singapore and finally Hong Kong. Here the containers were split and shared by two other container ships that finally reached the target Yokohama Port respectively on 19 September and 26 September.

After the customs procedure, the seals of the containers were opened and the status of the 72 boxes was jointly checked by all involved stakeholders - representatives of Nidec ASI, Consorzio RFX, F4E and JAEA - by examining the attached shock detectors. The complete check took three days, also considering the two different arrival dates of the ships: only a few shock detectors (4 of 87) were found to have tripped during the ship transportation, but the detailed inspection of the related boxes did not show any evident damage, giving reassurance on the actual status of QPC components.

After the check, the responsibility of component transportation passed from EU to Japan. JAEA contracted the transportation company UTOC Corporation for the remaining transport from Yokohama to Naka: each of the three days, at the end of the inspection, the checked boxes were extracted from the containers, new shock detectors were attached where needed and then the boxes were loaded on trucks that left Yokohama port reaching Naka site the following morning.



Participants to the check at port of Yokohama (first check day)



QPC boxes leaving the port of Yokohama after inspection

A short celebration took place in Naka in the morning of 26 September, to welcome the arrival of QPC components.

Finally the QPC boxes were positioned by UTOC near the final installation location in the rectifier building and in the extension area of the JT-60 experimental building, lifting them up where necessary with the help of a movable crane and temporary scaffolding.

The next step will be the opening of the boxes by Nidec ASI for starting the on-site installation activities that are foreseen to start at the end of November.



Arrival of QPC components at Naka



Celebration of QPC delivery at Naka



Lifting of QPC components up to the extension area of the JT-60 experimental building



QPC components stored in the rectifier building

News

EF coil and CS manufacturing progressing smoothly



Fully wound octa-pancake for CS

The manufacture of the equilibrium field coil (EF) and central solenoid (CS) is progressing well. For the EF coils, which will be installed in the upper section of JT-60SA, the winding of two single pancakes (SP1 and SP2) for the EF1 (outer diameter: 12 m) has progressed in parallel with the curing of the first two single pancakes (SP11 and SP12) for the EF2 (outer diameter: 9.6 m) and, at the beginning of October, the curing of the single pancakes for the EF1 was completed. Furthermore, the winding of the other single pancakes (SP9 and SP10) for the EF2 was started and is currently in progress.

For the CS, which consists of four modules: CS1, CS2, CS3 and CS4, the heat treatment of a 4-layer pancake (QP: quad-pancake) and five out of six 8-layer pancakes (OP: octa-pancake) for the CS1 was completed. The winding of the sixth OP for the CS1 was also completed.

News

Pipe installation for secondary cooling system completed



Installed pipes in the north (left) and south (right) of the secondary cooling system

The installation work of all the pipes for the cooling tower, which started in June (Newsletter No. 56), was completed as scheduled. In addition, the installation of the electric facility has also progressed well for the trial run scheduled this December.

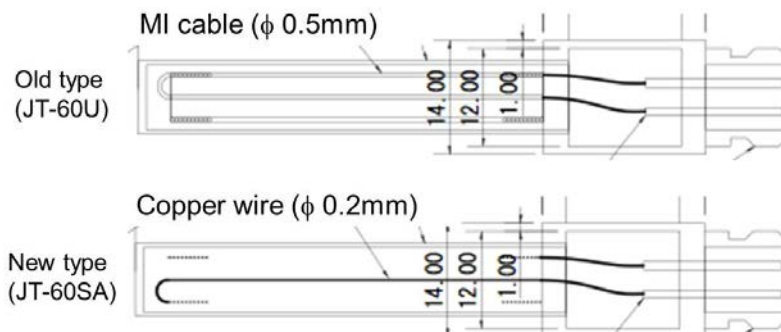
The operation of the secondary cooling system will finally start in April 2015 with the inspection of the motor generator.

News

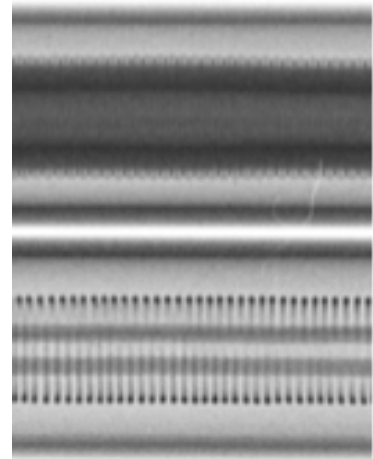
Rogowski coil prototype



Old (above) and new (below) types of Rogowski coils



Structural drawing



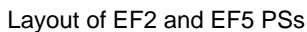
X-ray photos of old type (above) and new type (below)

The Rogowski coil for JT-60U was made of a mineral-insulated (MI) cable and was used to measure the plasma current as well as an electric current flowing directly and indirectly from the plasma to the peripheral equipment during a plasma disruption. This Rogowski coil will be improved for JT-60SA and its prototype has now been made.

The total length of the improved Rogowski coil for JT-60SA is approximately 17 m, which is twice as long as that of JT-60U. Considering reliability and cost of the very long and extra-fine MI cable, a fabrication technique using a sheathed heater was adopted (enclosing the heating element typically of nichrome wire with insulating material such as magnesium oxide).

In the Rogowski coil for JT-60U, the MI cable was wound around the stainless steel tube, but in the improved type, the copper wire is wound around the inorganic insulation. As a result, the diameter of the copper core wire can be thicker (0.2 mm) and the reliability increased. An improvement of the frequency response of the coil is expected.

Design Review Meeting for SCMPS



The purpose of the meeting was to point out the modifications proposed by JEMA for equilibrium field coil No. 2 and No. 5 power supplies (EF2 and EF5 PSs) in comparison to the already approved version of the first design report (FDR) on the EF3 and EF4 PSs, to highlight the differences between the designs of EF3 and EF4, and EF2 and EF5 PSs, to present the status of the pending issues raised during DRM-MPS23, and to collect additional comments to the FDR on the EF2 and EF 5 PSs (see figure), in order to validate it as soon as possible.

During this meeting, the JEMA expert described the present status of EF3 and EF4, and the FDR on the EF2 and E5 PSs. The main difference between the designs is only related to the use of two bidirectional and two unidirectional 5 kA bridges, due to the required rating of +10/-20 kA. For this reason the thyristor stacks of unidirectional bridges for EF2 and EF5 PSs have a reduced number of thyristors. Anyway the same kind of components are used both for EF2 and EF5, and EF3 and EF4 PSs, so that the simulations and calculations performed for the EF3 and EF4 PSs are practically valid also for the EF2 and EF5 PSs.

After presentations by CEA, F4E and JAEA describing their comments, a new revision of the FDR on the EF3 and EF4, and EF2 and EF5 PSs, taking into account the comments discussed during DRM-MPS24, was released by JEMA on 18 October.

Meetings

25th IAEA Conference



Figure 1: P. Barabaschi making the JT-60SA overview presentation

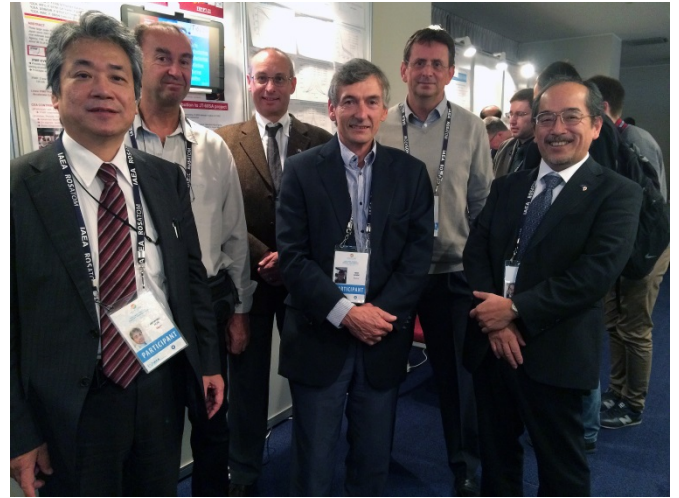


Figure 2: In front of poster panel presented by J.C. Vallet (3rd from the left)

The 25th IAEA Fusion Energy Conference (FEC), the main conference for the worldwide fusion community, was held at Hotel Park Inn Pribaltiyskaya in St. Petersburg, Russian Federation from 13 to 18 October 2014 and in total about 650 papers were presented.

P. Barabaschi, the EU Project Manager of the Satellite Tokamak Programme Project, gave an overview oral presentation entitled 'Status of JT-60SA Project' in front of an audience filling the large plenary session room (Figure 1). He reported that manufacture of the JT-60SA components has been going well on schedule both in the EU and Japan, thanks to their excellent team work, and the project is now entering a new phase of assembly. His very positive and clear presentation seemed to impress the whole audience.

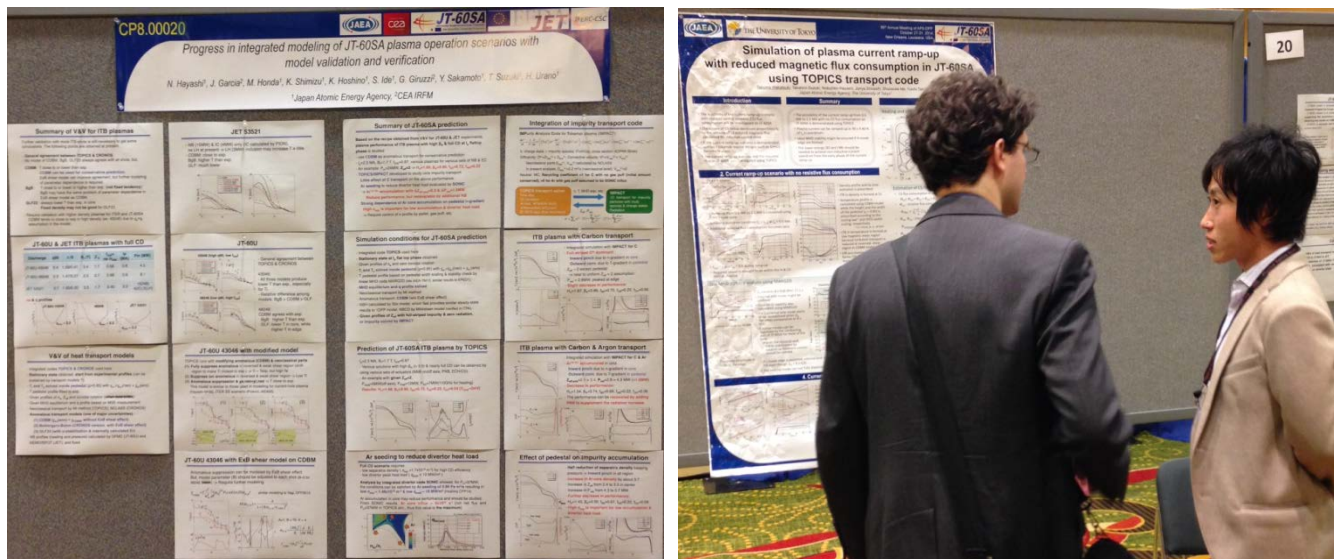
The main achievements related to the CEA contributions to the three projects of the Broader Approach: IFMIF/EVEDA, IFERC and JT-60SA were presented at the poster session by J.C. Vallet. Instead of using old-fashioned paper for its poster presentation, CEA chose a large interactive tablet to illustrate its different ongoing manufacturing with videos produced jointly with JAEA and CEA's industrial partners (Figure 2). This was most appropriate to reflect the very dynamic trend of the Broader Approach activities and to catch the attention of many participants and organisers.

The contributions from the JT-60SA EU and JA Home Teams were (only presenters are shown):

- Oral presentations (1)
 - P. Barabaschi from F4E Garching, on the status of JT-60SA project;
- Poster presentations (7)
 - P. Decool from CEA-IRFM, on the progress of CEA contributions to the JT-60SA TF coil procurements;
 - E. Gaio from Consorzio RFX, on the protection of superconducting magnets in fusion experiments: the new technological solution for JT-60SA;
 - T. Kobayashi from JAEA Naka, on the development of dual frequency gyrotron and launcher for the JT-60SA ECH/ECCD system;
 - Y. Koide from JAEA Naka, on the JT-60SA superconducting magnet system;
 - A. Kojima from JAEA Naka, on the progress in long pulse production of powerful negative ion beams for JT-60SA and ITER;
 - Y. Suzuki from NIFS Toki, on the 3D plasma response to resonant external magnetic perturbation and its impact on fast ion confinement in JT-60SA plasmas;
 - J.C. Vallet from CEA-IRFM, on the progress of the CEA contributions to the Broader Approach projects.

Meetings

56th APS DPP Annual Meeting



The 56th Annual Meeting of the APS Division of Plasma Physics was held at the Marriott Hotel in New Orleans, Louisiana USA from 27 to 31 October. More than 1,700 participants joined together to present and discuss the latest progress in fusion research.

During the conference, N. Hayashi from JAEA Naka presented a poster on "progress in integrated modelling of JT-60SA plasma operation scenarios with model validation and verification", performed in collaboration with CEA. In the presentation, transport models were validated by selected discharges in JT-60U and JET, and verified by TOPICS and CRONOS codes. Integrated modelling simulations with the validated transport model were presented, focusing on the plasma performance at the current flattop phase and its consistency with a seeding impurity transported to core and divertor regions. T. Wakatsuki (see figure) from JAEA Naka also presented a poster on "simulation of plasma current ramp-up with reduced magnetic flux consumption in JT-60SA using TOPICS transport code". TOPICS simulations demonstrated the possibility of current ramp-up with no consumption of central solenoid flux. These presentations attracted many participants.

Calendar

March 17, 2015

16th Meeting of the STP Project Committee (PC-16)
Naka, Japan

April 21, 2015

16th Meeting of the BA Steering Committee (SC-16)
Naka, Japan

April 22 – 23, 2015

22nd Technical Coordination Meeting (TCM-22)
Naka, Japan

May 17 – 21, 2015

23rd International Conference on Nuclear Engineering (ICONE-23)
Chiba, Japan

May 31 – June 4, 2015

26th Symposium on Fusion Engineering (SOFE-26)
Austin, USA

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 newsletter@jt60sa.org.

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