Industrial Production of Accelerator Components at CERCA (F)

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Abstract

This paper summarises CERCA's activities within the frame of accelerator technology during the 4 past years. Prototype Components(N.C. and S.C. cavities, tuners, RF antennas ...) as well as series of turn key accelerating modules are produced in an actual high level environment, especially devoted to manufacturing for high energy physics.

1. INTRODUCTION

CERCA (FRAMATOME Group) is now since 4 years the main supplier of turn key superconducting accelerating cryomodules for LEP 200 at CERN. This new notoriety among the different industrial partners of the research centers throughout the world, added with its experience in the manufacture of tricky nuclear devices has allowed CERCA to obtain the realisation of components from other accelerator projects.

Not only prototypes fabrication for various R & D needs in several laboratories, but above all an actual production on an industrial scale for CERN are undertaken in CERCA's workshops in Romans (F).

2. PROGRESS ON THE INDUSTRIAL PRODUCTION OF LEP 200 SC CRYOMODULES

The history of the production of previous SC the cryo-units (bulk Nb) and the beginning of the industrialisation of the present SC cryomodules (Nb/Cu) are already described elsewhere [1] [2] [3] and references therein.

CERCA has to supply before march 1996 twenty fully assembled and equipped turn key cryomodules to CERN. Five of them have already achieved the performances required for LEP 200 (see fig. 1). The sixth one has got a mechanical problem on one cavity and has to be repaired ...

Cryomodule n° L 2007 is now under RF test.

Cryomodule n° L 2002 has been installed in LEP tunnel by the end of 1993 and has reached an accelerating voltage of 40 MV with beam ! CERCA's cryomodules are now delivered at a rate of about 1 every 6 weeks.

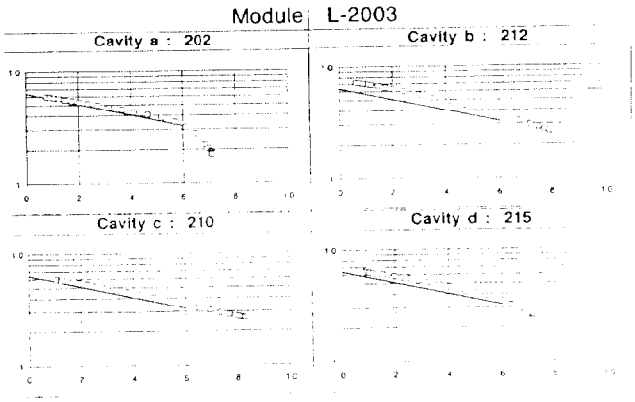


Figure 1. typical RF Test For LEP 200 Cryomodule (here L 2003 as delivered by CERCA)

3. PRODUCTION OF PROTOTYPE

CERCA is manufacturing the 75 MHz Cu cavity and its RF components (tuners and couplers) for the DAϕNE project accumulator : these parts will be delivered in autumn 94.

CERCA is also involved in the huge R & D program devoted to the preparation of TESLA project : seven single cell 1300 MHz Nb cavities and the first nine cells cavity for TTF injector have been delivered to CEA SACLAY in order to perform the RF test (see Figure 2 and).

As shown on Figure the RF results of CERCA's single cell cavities are beyond the expected goal for TTF. A very good result has been obtained on cavity n° C1-02 : 30 MVm^{-1} at $Q \sim 2.10^9$ thanks to a heat treatment on half cells before EB welding ... This result has to be confirmed on the second 9 cells cavity which is to be assembled in July ...

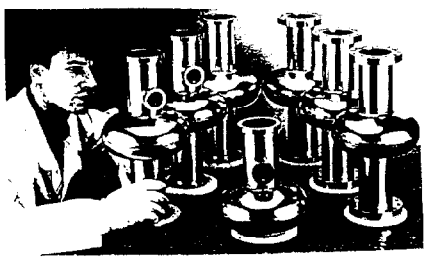


Figure 2. single cell 1300 MHz TESLA type Nb cavities

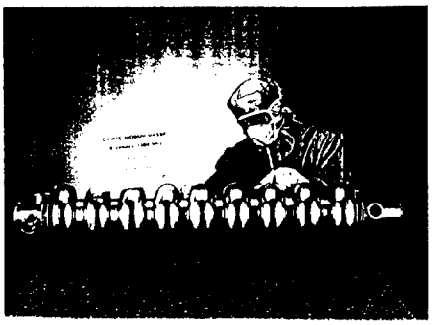


Figure 3. nine cells 1300 MHz cavity for TTF injector

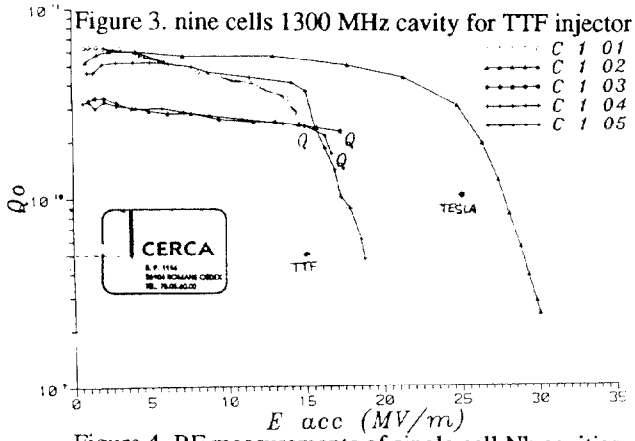
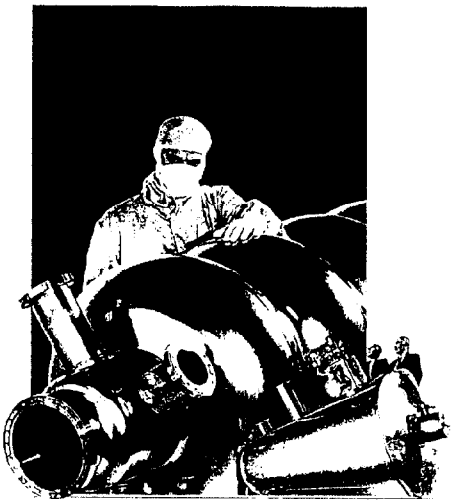
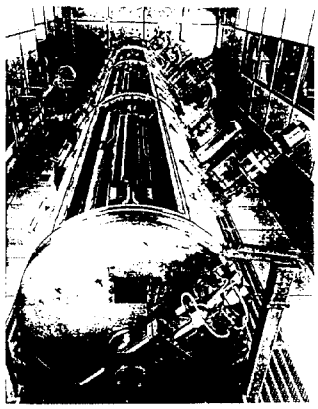


Figure 4. RF measurements of single cell Nb cavities





4. CONCLUSION

CERCA is now a new valuable supplier for accelerator components. The accumulated experience in the industrial manufacturing of these peculiar objects, like SC cryomodules, allows to expect the completion of large accelerator projects to be achieved in quite good conditions of time schedule and costs.

It is shown that French industry participates as early as possible to development works on future accelerators in order to try to lower the manufacturing costs and, by the way, to make these projects to exist.

5. REFERENCES

[1] S. Cavallari et al, "S.C. Cavities for LEP energy upgrade", HEACC'92 Conference Proceedings, Hamburg, Germany, July 92, pp 694-696

[2] C. Bianchi et al, "LEP 200 RF SC Cavities : and industrial experience at CERCA", HEACC'92 Conference Proceedings, Hamburg, Germany, July 92, pp 766-768

[3] P. Maccioni et al, "Progress on the industrial production of SC cavities at CERCA", Workshop on RF Superconductivity Proceedings, CEBAF Newport News, USA, October 93 (to be published)