STATUS REPORT ON THE VARIABLE ENERGY CYCLOTRON AT CALCUTTA

D.N. Kundu
Saha Institute of Nuclear Physics, Calcutta, India

ABSTRACT

For the Variable Energy Cyclotron under construction at Calcutta, the design features of the Berkeley 88-inch cyclotron, as slightly modified in the similar A & M Texas machine, have been adopted. The construction is a Bhabha Atomic Research Centre project under the Department of Atomic Energy, Government of India, and is taking place in an area of 28 acres of land jointly with the development and expansion programme of the Saha Institute of Nuclear Physics. The relevant machine specifications have been incorporated in the ORNL compilation "Cyclotrons - 1972, AVF and FM". Two major changes in this machine are that (i) the magnet yoke pieces are of cast steel and (ii) the trim and valley coils are epoxy potted and not mineral insulated. The progress of fabrication and testing for different items is briefly given below.

MAGNET (MECHANICAL)

For the magnet frame all the yoke slabs have been rough machined and ultrasonically tested after chemical analysis and magnetisation measurements. Machining of the pole pieces has started for the valley floor plate and dee tank cover plate. Fabrication contract has been awarded to HEC at Ranchi. Imported forgings are being used for the sector tips. Progress made is about 50%.

MAGNET (ELECTRICAL)

The contract for coils has been given to HEIL at Bhopal. The winding of imported hollow copper conductor of the main coils is in progress. Process technology for the fabrication of trim and valley coils has been worked out and epoxy consolidation process has started. Fabrication of fixtures for magnetic field mapping is nearing completion and that of the electronic units continuing. The overall progress is about 25%.

RF SYSTEM (MECHANICAL)

The order for the resonator tank has been placed on the Garden Reach Workshop at Calcutta. The RF panel construction is going on at

the Central Workshop, BARC. Work on the anchorage and adjustment mech anism is continuing and that on the dee stem, dee and transmission lines is in shop drawing stage. The progress so far is about 20%.

RF SYSTEM (ELECTRICAL)

Major parts of the main oscillator are under fabrication at ECIL, Hydrabad. The primary of the filament transformer for the RCA 6949 oscillator tube has been fabricated and tested by EMCO Pty. Ltd., Bombay and the secondary is being fabricated at BARC. The progress made is about 35%.

VACUUM

The large 35-inch diffusion pumps, chevron baffles and gate valves have been fabricated. Beam transport vacuum system module has been tested and a vacuum of 2×10^{-7} Torr obtained with liquid nitrogen cooling of the chevron baffle. A progress of 40% has been made.

ION SOURCE & PROBES

Most of the ion source parts have been made. Assembly and tests are under way. Fabrication of probes is continuing. 35% of the target has been reached.

DEFLECTOR

TATA - DSMA, Bombay, have been appointed as consultants for the fabrication of the main deflector assembly. A 1/4 scale working model has been made for use on the control desk. 40% of the work of fabrication has been completed.

POWER SUPPLIES

All the sub-assemblies of power supplies for 11 trim coils, five valley coils and interlocks have been sent to Calcutta together with the first lot of seven cabinets. Work on the final assembly will begin at site. 60% of the total work has been done.

CONTROLS

The layout of the control panel has been made. In situ fixtures like S-bends, underfloor and overhead channels have been laid. Fabrication drawings are under preparation. The ITI, Bangalore has been given the task of doing the control wiring. A preliminary 15% progress is estimated.

BEAM TRANSPORT

The fabrication of the analysing magnet is going on with the TATA - DSMA, Bombay as consultants. Copper conductor for the analysing magnet, switching magnets and 14 quadrupole doublets has been received from Belgium. An estimated 30% progress has been made.

DATA PROCESSING SYSTEM

Specifications of on-line computer requirements have been drawn up. Fabrication of prototype modular fast electronic units has started. The scattering chamber is still in design stage. The progress is estimated at 30%.

WORKSHOP

There is a workshop by the side of the accelerator area. The machines are already on hand and ready for installation. Progress is 40%.

BUILDING

RCC work in accelerator and service wings is nearing completion. RCC floor in the mechanical/electrical equipment room, the flooring in A/C plant room and the fixing of steel windows, doors, etc. are in progress. About 60% of the work has been completed.

SERVICES

The EOT crane is ready for installation. Air conditioning contract has been awarded and work for demineralized and ordinary water supply has been started. 90% of the Civil Engineering work in the lab-cum-office wing has been completed. An overall progress of 50% is estimated.

The work as a whole is about to cross the middle point and the activity will reach its peak during the first part of the next year. A Users' Committee has been planning the fabrication and installation of several terminal equipments for the utilization of the machine by physicists, chemists and bio-scientists. Taking a look at the whole picture, the progress made is considered satisfactory and the workers feel optimistic about the future prospects.