§48. A Divertor-Plate Mock-up

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Detail design of the target plates of the helical divertor has been completed. The basic feature of the target plate design is as follows:

- The arrangement is based on the concept of the discrete-bar array[1].
- An element of the target plate consists of a flat graphite tile and a copper backing plate mechanically fixed to a cooling tube.
- The cooling tube is made of stainless steel, bent helically along a trace of striking points of a divertor leg.
- A cooling tube is fixed to the inner wall of the vacuum vessel and provides a half pitch unit of cooling loop of the divertor (180° in poloidal, 36° in toroidal angle).
- Forty to fifty elements are fixed to one cooling tube with a mechanical joint adapter.
- Corresponding to the helical pitch number in LHD, forty units of half-pitch divertor plate will be installed.
- Total number of the elements is 1800 - 2000.
- The cooling tube and the tile-array is re-arranged to give a maximum opening at a region of a port hole.

Two sets of the divertor-unit mock-up have been fabricated and installed inside a real size model of the vacuum vessel of 36 ° in toroidal direction. Figure 1 shows a view of the mock-up for an inside divertor leg. Most of the tiles have same shape and size. Some tiles have special shapes in order to minimize a gap between two tiles as is seen in Fig. 1.

Accuracy of the tile alignment has been investigated after the completion of the installation. It has been confirmed that there is no major problem to fabrication and installation of the divertor unit based on this design.

A tiles arrangement of the port hole region is investigated in detail in order to provide the opening as large as possible (see Fig. 2)

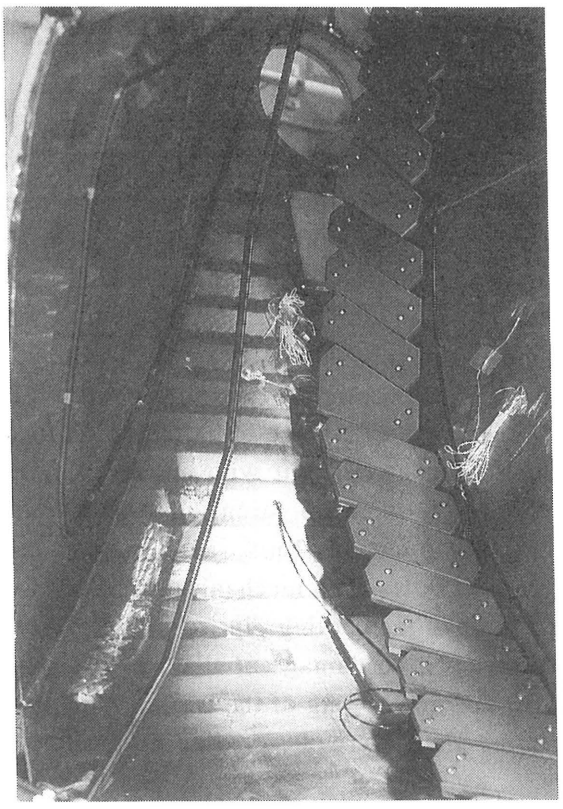

Fig. 1 Mock-up of an inside divertor unit

Reference

1) Noda, N. et al., "Fusion Technology 1992", (Proc. 17th SOFT, Rome) 1993, Elsevier Science Publishers, Amsterdam. p.325.

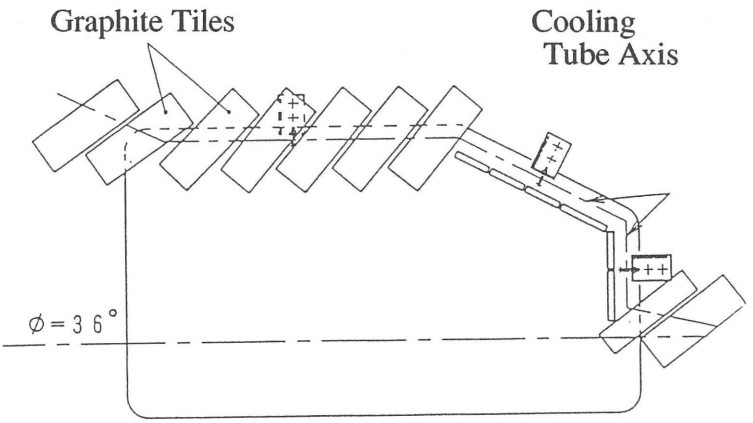

Fig. 2 An arrangement of the tiles at the opening of an upper port hole