

§10. Development of Mobile Robots for Remote Maintenance in FFHR

Ashikawa, N., Tamura, H.,
Takahashi, M. (Tokai Univ.)

Connectional designs of remote maintenance systems are started in FFHR. But many technical issues are remained related communicated structures of in-vessel components. For example, it knows a difficult thing from the viewpoint of structure and inside space to just introduce a vehicle type device designed for ITER into a helical type nuclear fusion reactor differing in the internal structure of the furnace really. In this study, we divide it into structure in 1) furnace, large size maintenance robots changing such as tiles, two of a high small size maintenance robots of the flexibility about 2) movement about the method about the remote maintenance method in the furnace for helical type prototype reactor FFHR and examine remote maintenance technique. A Contribution for the whole nuclear fusion reactor is expected in particular without being considered including tokamak devices about small size robots in fusion.

There were safekeeping of the waste, a report about the decontamination. We introduce a scenario of the maintenance exchange of the blanket which you cut in a furnace to the cause about the evaluation examination about structure of related buildings and the function. Install the storage of safekeeping of the radiation pollutant to surround the tokamak hall, and can carry an emission monster transported from the tokamak hall effectively; is considered. Movement with the crane is planned in the tokamak hall, but there is the problem that you should examine about the protection method of the high emission monster, and this is FFHR and a common problem.

There was an introduction about an evaluation about the pollution of the blanket maintenance equipment in ITER. Radio-activated dust particles which occurred in ITER plasma vacuum container dispersed on the maintenance equipment surface and supposed it to attach, and an evaluation was performed about the influence that those radiation doses gave to the decontamination of the remote device. In addition, we confirmed the point where an

emission monster was easy to accumulate and carried out the evaluation of the residual radiation dose.

Attachments of leg of small robots are important role in climbing up the walls. However for the sticking force of the sucker depends on the smoothness of the wall. Hence, in the practical situations, the suckers may not be preferred. In addition, in a vacuum, the suckers are useless. Then, this research presents a new attachment designed as shown in Fig.1. This attachment of the flexible crow can catch the crevice between blankets. In our future works, it will be built up, and its effectiveness will be confirmed through experiments.

Designs are going to be changed to improve decontamination efficiency by changing a design to dismantle a part of the maintenance equipment at operational time of maintenances.

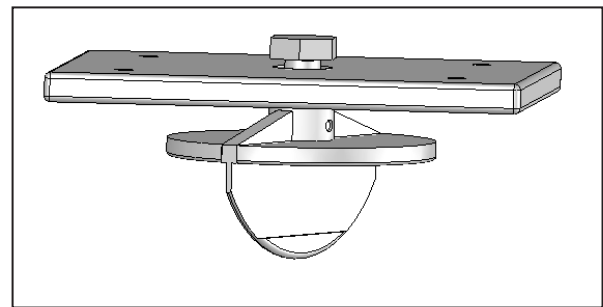


Figure.1 An attachment of small roots.
A plane insert to gaps between plasma facing components