# IFERC Newsletter

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International Fusion Energy Research Centre, Rokkasho, Aomori 039-3212, Japan


**Status of DEMO Design Activity**

## Highlights on Remote Maintenance

To meet the requirements of task-4, the major design studies; "Working Group Maintenance Facilities (WG-MaFa)" and "Interface structure of Vacuum Vessel (VV) port for remote maintenance" were conducted in EU and JA.

*Working Group Maintenance Facilities (WG-MaFa):*

In the frame of EU DEMO activities regarding the development of the pre-conceptual design, studies on maintenance are carried out to address the DEMO Power Plant availability based on robust and cost acceptable design solutions. This covers

- the definition of the "envelope scenarios of maintenance" (see Fig-1) to be considered by DEMO Central Team (DCT) for the design of the facilities: space allocation, the main tools needed (remote handling, casks, platforms for workers, access, handling systems…), the frequency of the tasks, the operative constraints,
- the support of an external industrial Consortium with experience in maintaining nuclear facilities,
- a proposal to set up a working group involving several experts from DCT and external, to provide relevant input data to the AEF consortium.

The Working Group Maintenance Facility (WG-MaFa) aims to determine and propose two bounding variant studies targeting the demonstration of the maintainability of the DEMO machine.

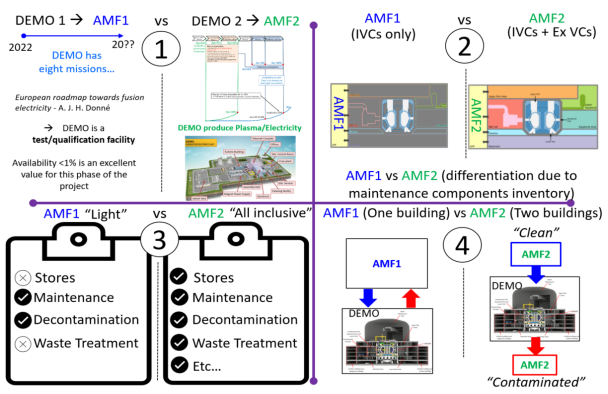


Fig-1: Definition of envelop maintenance scenarios

*Interface structure of Vacuum Vessel (VV) port for remote maintenance:*

The interface structure of VV and IVC (In-Vessel Components), such as Blanket Segments (BSs) and Divertor Cassette (DC), need to be designed to be consistent with Remote Maintenance (RM). The interface structure includes the maintenance ports and guide structures. BSs and DCs are to be independently replaced from the VV's upper and lower ports, respectively, using the remote maintenance system. The VV has 16-vertical upper ports with large trapezoidal opening ports. This VV guide structure can stably handle BS having huge weight and height structures. A suitably reinforced rib in the poloidal direction around the VV guide structure helps to maintain the structural integrity of VV and to overcome the strength reduction due to the large opening ports during remote maintenance.

The safety confinement barrier of the VV is a fully welded double-wall structure comprising conventional austenitic stainless steel tentatively selected by considering licensing, maintainability, and waste disposal. The double wall comprises an inner wall, an outer wall, and poloidal ribs with plates that have a thickness of 60 mm. The major loads that acted on the VV in the ductile failure mode include the pressures between double walls, dead weights, static seismic loads. These major loading events, load combinations, and design criteria for VV have been provisionally classified based on the structural design criteria for ITER.

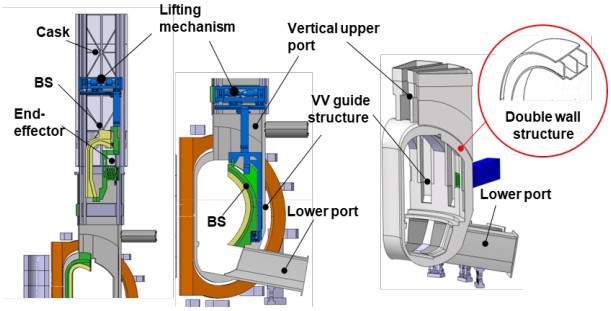


Fig-2: Schematic view for RM for blanket segment (left) and VV configuration (right)

*(DEMO Design Task-4 TROs)*