

Conceptual Design of the Articulated Boom for EAST In-Vessel

Components Maintenance

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Abstract : EAST is planned to be operated in different phases and the initial operation of EAST is focused on physics scenarios, plasma elongating experiment and plasma control experiment, etc. EAST will be operated with D-T experiment during the next stage in future five or ten years. Due to neutron activation, maintenance of EAST In-Vessel Components has to be carried out remotely. The articulated boom has been designed as the sole means for carrying components, machines, tools and equipments into and out of the EAST tokamak. It is designed to transport in-vessel components into and from vacuum vessel through the equatorial port using various end effectors. The articulated boom consists of five straight sections and five motorized horizontal joints, which will enable the articulated boom to reach any point in the equatorial plane of the inside of EAST tokamak. The load capacity with all the components will be 300kg (compared with the 700kg capacity without additional boom when the articulated boom can reach only half of the EAST tokamak from one port).

This paper resumes conceptual design of the articulated boom, including design requirements analysis, mechanical design. Feasibility of this design was confirmed by the structural analysis for the articulated boom carrying components, machines, tools and equipments and the kinematical analysis for the articulated boom into and out of vacuum vessel via equatorial port without interference.