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Manufacturing design assessment of the welded in-wall shield rib for ITER

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Between inner and outer shells of vacuum vessel, numerous in-wall shielding (IWS) blocks are installed to provide neutron shielding. Uniquely, the IWS ribs in sector 1 and 6 are manufactured by welding and its manufacturing design shall be secured for not only manufacturability but safety point of views.
For design of IWS ribs, complex loads for multiple directional electromagnetic force, coolant pressure and earthquake shall be considered simultaneously. Moreover, in-service inspection is impossible after commissioning ITER therefore proper design assessment procedure should be applied with reasonable conservatism. In this paper, an approach for manufacturing design assessment of welded IWS ribs is proposed. On the basis of that approach, four representative models are screened by geometric factors and load magnitude. Under the most conservative loads among multiple loading conditions, structural safety of each representative models are verified with RCC-MR. The deviation requests for this assessment was approved to ITER Organization and ANB. This approach and results could be used as a reference for design of vacuum vessel components which is impossible for
in-service inspection.

Eligible for student paper award?

No

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