

DESIGN ANALYSIS OF THE HINGE SUPPORT FOR THE ITER VACUUM VESSEL

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The ITER vacuum vessel supports located in the lower level shall sustain loads in radial, toroidal and vertical directions. A new support system has been proposed instead of previous complicated support systems. The hinge support consists of two hinges, upper and lower blocks and dowels. In order to develop the design concept and verify the structural integrity of the hinge system, the design analysis has been performed in detail which includes heat transfer, elastic stress and limit analyses.

According to the heat transfer analysis for VV baking stage, total heat flow into the support is 1.2 kW which satisfies the design requirement. Through the structural analyses the design of the major components such as primary hinge, blocks and dowels are optimized from the structural and material points of view. High stresses occur around dowel holes of primary hinge and lower block. In order to increase the strength of major components, dowel holes can be locally reinforced using high strength sleeves by shrink fit or cladding.

For verification of the design of the newly proposed support in accordance with RCC-MR code, the elasto-plastic limit analysis together with elastic stress analysis has been performed. From those design analysis results, it has been found that the new hinge support can safely withstand the specified design loads of the ITER vacuum vessel.

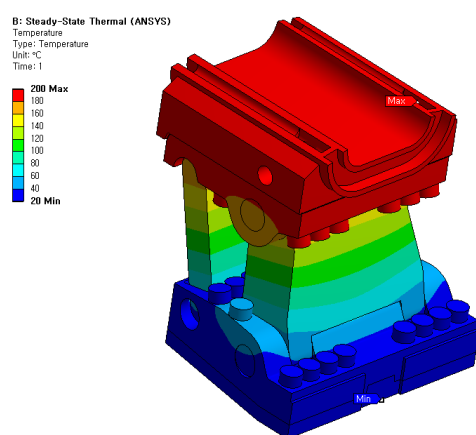


Figure 1 : Temperature distribution contour

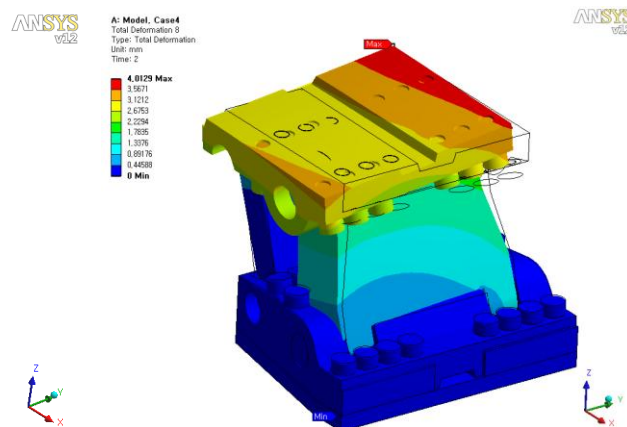


Figure 2 : Displacement contour