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Ignitor Vacuum Vessel Structural Design with Dynamic Loads Due to Plasma Disruption Event ANTONIO CUCCHIARO, CLAUDIO CRESCENZI, GIUSEPPE MAZZONE, ALDO PIZZUTO, GIUSEPPE RAMOGIDA, MASSIMO ROCCELLA, Associazione ENEA-EURATOM sulla Fusione, C.P. 65, 00044 Frascati (RM), ITALY, ALDO BIANCHI, BRUNO PARODI, Ansaldo Ricerche, Corso Perrone 25, 16152 Genova, ITALY, MAURO LINARI, FLAVIO LUCCA, ANNA MARIN, L. T. Calcoli, Piazza Prinetti 26/B, 23805 Merate (LC), ITALY, BRUNO COPPI, MIT, Cambridge, MA — The new reference plasma disruption for IGNITOR produces a significant increase of electromagnetic (EM) loads and requires a dynamic elastic-plastic structural analysis of the vacuum vessel (VV). The EM loads due to the worst disruption event (VDE) have been calculated using the MAXFEA 2D code and it is found that the stresses and deformation that would be produced on a relatively thin chamber could be excessive. A varying thickness configuration for the VV has been adopted on the basis of a step by step optimization with the aim of minimizing the vertical displacement while complying with the allowable plastic strains. A non-linear analysis is required with a modelling of the entire (360) VV structure. With the new thickness distribution, the VV is capable to withstand several hundred of cycles under plasma disruption conditions in compliance with the ASME III code rules.

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