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P4.150 Parametric Modelling of Remote Maintenance Strategies and Concepts for EU DEMO

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One of the major challenge in the commercialisation of magnetic confinement fusion is maintaining the powerplant reactor in a sufficiently short period of time to achieve commercial levels of plant availability. To inform the development of an appropriate remote maintenance strategy for EU DEMO, a simplified, parametric model, called the Maintenance Duration Estimator (MDE), has been created to enable comparative analysis of various remote maintenance concepts and strategies. These models will be used to inform the development of remote maintenance strategies and methodologies for EU DEMO.

Using the MDE, a model of the duration of various maintenance activities was created, which in turn was used to develop a 20-calendar year maintenance program for EU DEMO. The currently proposed Ex-Vessel maintenance program was also modelled. Here we will present the conclusion of this work, which estimated the lifetime durations of in-vessel and ex-vessel maintenance activities. This found that 26% of DEMOs lifetime is dominated by ex-vessel maintenance activities, compared to 19% in-vessel operations, resulting in 41% powerplant uptime. Therefore, design considerations to support maintenance should be integrated into the plant design from the outset to minimize plant downtime

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