

BA原型炉におけるセクター遠隔保守方式の重要設計課題
Technical issues for sector transport maintenance in BA DEMO reactor

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In Broader Approach (BA) DEMO design activity assessment of various maintenance schemes for DEMO reactor has been studied. The maintenance scheme is one of the critical issues for DEMO design. In order to decide a most probable DEMO reactor maintenance scheme, assessment of various maintenance schemes for DEMO are important. This paper describes the main results on the vertical sector transport maintenance scheme which has been studied in recent BA DEMO design activity in Japanese home team. In the view of plant availability, the replacements of a large number of damaged components like in ITER would not be reasonable. In addition, the remote handling devices need to endure high radiation environment ($\sim 100\text{MGy}$) in reactor. Although various maintenance schemes for DEMO were proposed, in order to decide a most probable DEMO reactor maintenance scheme, clarification of assessment factors for DEMO maintenance is important. The sector transport maintenance scheme has advantages to maintain blankets and divertors without the use of sophisticated remote handling devices including sensitive devices to radiation in

the reactor.

This paper mainly focuses on a sector transport maintenance scheme from the aspects of high plant availability. The sector transport maintenance scheme has advantages to be short maintenance time and to maintain blanket and divertor without the use of sophisticated remote handling devices including undurable devices to radiation in the reactor. In this study, considering three different maintenance schemes based on (1) the number of maintenance port and (2) the insert direction, as shown in fig.1, the critical design factors and key engineering issues on the sector transport maintenance scheme are clarified. This design study clarifies critical design factors and key engineering issues on the maintenance scheme, that is, (1) how to support an enormous turnover force of the toroidal field (TF) coils in the large open port for sector transport and (2) the transferring mechanism of sector in the vacuum vessel. In these assessment factors, the sector transport using limited number of horizontal maintenance ports (SLH) maintenance scheme is a more realistic maintenance scheme.

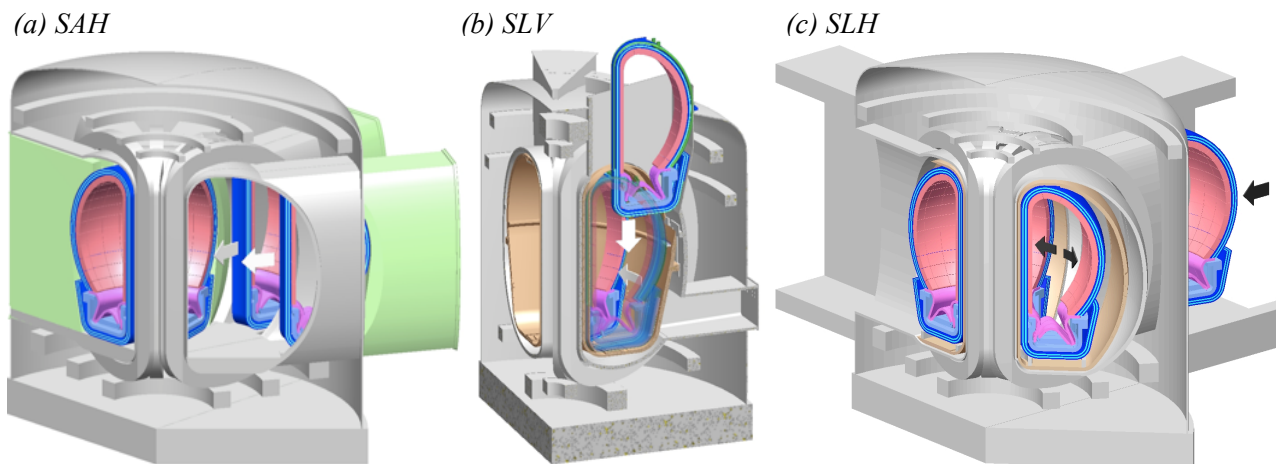


Fig. 1. Three patterns sector transport maintenance (a) the sector transport using all horizontal maintenance ports (SAH), (b) the sector transport using limited number of vertical maintenance ports (SLV) and (c) the sector transport using limited number of horizontal maintenance ports (SLH)