THE LOOSING MECHANISM OF SCREW BOLTS ON THE FIRST WALL

GRAPHITE TIES IN EAST

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Abstract

The Experimental Advanced Superconducting Tokamak (EAST) has fit 4896 graphite tiles on the heat sink to protect other components. After past twice running during last year, it has been found that some graphite ties has escaped or loosed from heat sink. Though these graphite ties are just about 1% compared with total graphite tiles. It has proved to be serious problem as it will lead to heave damage heat sink or cooling water piper. In fact it will at last stop the EAST electrical discharge. All graphite ties have been designed specific structure make them can be fixed to heat sink by using screw bolts. These screw bolts will vibrate excited by electromagnetic force. The process of loosing during screw bolts vibration can be present to be a mathematical model. The graphite ties and screw bolts can be seen as a mass-spring system. By analysis of the screw mechanism in detail, the vibration of the graphite tiles can be described by a second-order differential equation. The mathematical model explain what conditions can affect the process of loosing. From simulation results it described that how pre tightening loads on the screw bolts affect the process of loosing and that how coefficient of friction on the contact surface between graphite tiles and heat sink. So it is possible to improve the stability of fixed graphite tiles on the heat sink by take advantage of simulation results of this model.

Key words: loosing mechanism, vibration, electromagnetic force