OVERVIEW : FREE SURFACE MEASUREMENT WITH RENEWED NOZZLE OF

OSAKA LI LOOP

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Characteristics of surface waves on a high-speed liquid lithium (Li) flow have been examined using a Li circulation loop at Osaka University for the International Fusion Materials Irradiation Facility (IFMIF). For the purpose of easy observation of the Li and development of diagnostics, viewing ports of the Osaka Li Loop test section were renewed. In this paper, design and fabrication of the new test section and results of the preliminary experimental results will be presented.

Figure 1 shows a picture of ports and enclosure vessel of the new test section. While the old test section was equipped with three ports, the new configuration was supplied with a single large port, which will also enable nozzle replacement. The new nozzle was consisted of mechanically fastened bottom and upper pieces, and the latter can be replaced without replacing whole test channel. The larger port enables us to observe continuously flow appearance from the nozzle exit to region of 150-200 mm downstream, which corresponds to the beam irradiation region in IFMIF target. The old nozzle edge was damaged due to Li erosion/corrosion, and it generated many surface wakes and disturbed the measurement of plausible free surface shapes. Therefore, with flow experiments at old nozzle, it had been difficult to predict flow surface condition of IFMIF. In order to measure the surface shapes free from multiple wakes. The nozzle was renewed and in this occasion, to replaceable configuration of upper part.

We performed Li flow experiments with new test section successfully. The surface wave was found to be much low than with previous one. Figure 2 show freeze-frame picture of the free-surface flow recorded at the first large port when the velocity of Li flow was 9 m/s.

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Figure 1: The new ports of test section



Figure 2: Freeze-frame picture taken at the first large port by a high-speed video camera