

ANALYSIS OF FLOW-INDUCED VIBRATION OF NUCLEAR STREAM GENERATOR F U-TUBES USING OPENFOAM

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Nowadays nuclear power is increasingly used in the occasion of energy supply. However some problem also might happen in nuclear power plant, especially the steam generator, which could lead to serious consequence and must be paid much attention to. In the steam generator(SG),the u-tubes will interactor with the support plant because of fluid induced vibration(FIV)caused by high-speed water in SG. At the first place, I give an introduction of SG structure and the mathematic model FSI(fluid structure interaction). Then I simulate this process by OpenFoam after modeling, meshing, initializing and FsiFoam programming, which is based on computational fluid dynamics (CFD)code. The simulation help us get the fluid-solid interaction details. How the fluid forces interact with U-tubes were explained. The flow region at the U-tube and fixure contact area has been detailed and analyzed, then the frequencies and amplitudes of vibration at the contact area were determined. This will lay the foundation for dynamic analysis of FSI in SG U-tubes and the reasons, and it also can help the scientists take more protection to avoid the negative effect of fluid induced vibration (FIV).