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Abstract
Considering the accuracy of frequency and stress, FEM is superior then lumped parameter dynamic program. However, FEM alone cannot obtain the blade overload under power fault. The dynamic simulating torsional response had been proved quite accurate by the experiment, but for the extended part of the blade, the credibility is relatively poor since the model is simple and crude. This thesis adopts torsional response simulation to get the analytic information which is employed by FEM and the mesh analysis of the blade.

This thesis is to establish an appropriate mechanical system model for the rotor parts and the final three stages blades of a low-pressure turbine. It makes use of the verified dynamic program to simulate the torsional vibration of turbine-generator in the severe power fault (line-to-line short circuit). It explores the suppress effect of blade fatigue induced by vibration as the incident happens owing to the variation of the inertia of “Flywheel Damper” installed on the coupling. The Finite Element Method is aided to make the stress analysis of turbine blade details.

On the basis of the finite element analysis software ANSYS. Firstly, we simulate the steam thrust added on last stage blades at ordinary time and probe which part on last stage blade bear the maximum force. Secondly, the vibration torque due to line-to-line fault has been added on the shaft, and probes the last stage blades under stress condition. Finally, the same finite element analysis software ANSYS is adopted to compare the stress condition of the blade with the flywheel damper of variant inertia. The research aimed on designing proper equipment to reduce vibration and limit vibration torque under network fault in order to lengthen the result of life-span to charge. Moreover, the utilization of 3D blade to simulate and find out which part bear the maximum strength is also good for overhaul consulting at ordinary times. Furthermore, enormous damages can be prevented.

Keywords：FEM, turbine-generator, final three stages blades
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