On the damage process of a specimen's standard low cycle fatigue testing

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1.An introduction of my institute (Institute of Thermal Power and Automation),

2.Simulation research on the damage process of a specimen's standard low cycle fatigue testing. Standard fatigue testing of metal materials in varied loads and varied temperatures is very important for research on remained service life assessment models but always a time-and-money-costing task also. Quenched and tempered low-alloyed 30Cr2MoV steel has been widely used for producing large high temperature and heavy-duty turbine rotors. In this research, a mixing-harden constitutive equation is established by elasto-plastic mechanics theory. The incremental finite element program for emulating the internal stresses field is carried out for virtual fatigue testing of materals. With the program, several fatigue testing processes has been simulated cycle by cycle. A damage assessing method is setup from the above relation at the end of the paper, which can also be used to evaluate the damage of the rotors directly. Result shows that large quantity of iteration is needed in the cyclic fatigue process; the stability can be still guaranteed. Long computing time and big storage space is also needed for the simulation.