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Stress Analysis of Water Wall Tubes of a Coal-fired Boiler during Soot Blowing Operation

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Abstract : This research aimed to study the influences of a soot blowing operation and geometrical variables to the stress characteristic of water wall tubes located in soot blowing areas which caused the boilers of Mae Moh power plant to lose their generation hour. The research method is divided into 2 parts (a) measuring the strain on water wall tubes by using 3-element rosette strain gages orientation during a full capacity plant operation and in periods of soot blowing operations (b) creating a finite element model in order to calculate stresses on tubes and validating the model by using experimental data in a steady state plant operation. Then, the geometrical variables in the model were changed to study stresses on the tubes. The results revealed that the stress was not affected by the soot blowing process and the finite element model gave the results 1.24% errors from the experiment. The geometrical variables influenced the stress, with the most optimum tubes design in this research reduced the average stress from the present design 31.28%.

Keywords : boiler water wall tube, finite element, stress analysis, strain gage rosette
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