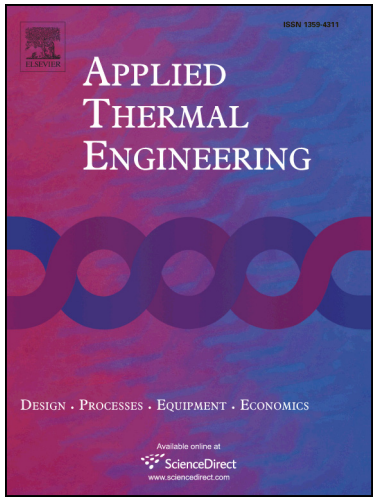

Low-Temperature Ash Deposition and Dewpoint Corrosion of a Coal-Fired Traveling Grate Boiler

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PII: S1359-4311(16)33194-5
DOI: http://dx.doi.org/10.1016/j.applthermaleng.2017.02.052
Reference: ATE 9933

To appear in: *Applied Thermal Engineering*

Received Date: 10 November 2016
Revised Date: 5 January 2017
Accepted Date: 12 February 2017

Please cite this article as: H. Chen, P. Pan, J. Jiao, Y. Wang, Q. Zhao, Low-Temperature Ash Deposition and Dewpoint Corrosion of a Coal-Fired Traveling Grate Boiler, *Applied Thermal Engineering* (2017), doi: http://dx.doi.org/10.1016/j.applthermaleng.2017.02.052

Low-Temperature Ash Deposition and Dewpoint Corrosion of a Coal-Fired Traveling Grate Boiler

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ABSTRACT: The low-temperature ash deposition and dewpoint corrosion of three materials were studied under six tube wall temperatures in a coal-fired travelling grate boiler. The experimental and simulation results showed that the leeward sides of the test sections were prone to suffer serious ash deposition and corrosion caused by acid condensation. The ash deposition and corrosion characteristics were different in various wall temperature ranges and the mechanisms were discussed. The corrosion resistance of the three tested materials was as follows: 316L>ND>20#. Recommendations were given to choose the materials for the waste heat recovery of coal-fired travelling grate boilers.

KEY WORDS: Flue gas cooling; Viscous ash deposition; Dewpoint corrosion; Coal-fired travelling grate boiler; Tube wall temperature; Waste heat recovery

1 Introduction

Industrial boilers are widely used in domestic heating and industrial processes. For now, there are more than 570 thousand industrial boilers operating in China, and more than 60 percent of them are travelling grate boilers [1], consuming more than 400 million tons of coal each year [2]. But the average thermal efficiency of these boilers is low and only around 65% [2, 3], which is very probable to be improved [4]. One of the important reasons for their poor efficiency is that their exhaust gas temperatures are usually high [5], ranging from 160°C to 300°C