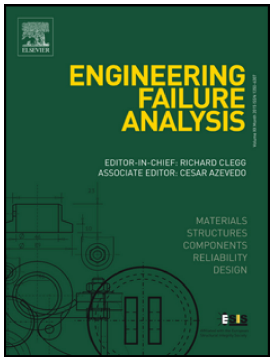

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A case study on failure of superheater tubes in an industrial power plant

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ABSTRACT

A failure analysis investigation was carried out on the secondary Superheater tubes of a boiler unit in a steam power plant. The tubes, made of DIN-16CrMo4 steel, failed by bulging and rupture only after about three years of operation. Metallurgical investigations revealed that microstructural degradation had mainly occurred at the external (fireside) tube surface. Long-term overheating was identified as the root cause of the premature failure.

Keywords: Superheater; Rupture; Overheating; Microstructural degradation.

Highlights

- Detailed investigation on rupture of several superheater tubes was performed.
- Most severe failure occurred on the external surface of the tubes.
- Long-term overheating was identified as the root cause of failure.
- Oxidation in hot flue-gas atmosphere and fly-ash erosion accelerated the tube rupture.

1. Introduction

The primary function of a boiler is to generate steam for the turbine to produce electricity. The steam is heated in a convective superheater at higher temperatures prior to delivery to the

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