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Influence of grinding parameters on surface temperature and burn behaviors of grinding rail

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Abstract: Reasonable grinding parameters are significant problem affecting surface quality of rail grinding. The objective of this study is to explore the effect of grinding parameters on rail grinding temperature and burn behaviors using an inserted semi-artificial thermocouple method. When the grinding temperature exceeds 600 °C, the grinding burn occurs on the rail surface and accompanies with the appearance of white etching layer (WEL). The essence of rail grinding burn is that the rise of grinding temperature causes the aggravation of surface oxidation and the accumulation of nonferrous oxides. When the temperature continuously ascends to 802 °C, visible grinding cracks and quenching cracks are observed. Furthermore, the relationship of surface state, grinding burn and grinding temperature of rail specimen is proposed.

Keywords: Rail grinding; Semi-artificial thermocouple; Grinding temperature; Grinding burn

1. Introduction

After the railroad has been running for a period of time, there are various kinds of damages on the rail surface, such as rail corrugation, surface spalling, fatigue crack and so on, which seriously affect the operation security of railway [1-4]. Rail grinding as an effective and economical way to alleviate surface damage is widely used in the maintenance of railway track. Furthermore, rail grinding as a complex cutting process of materials, there are many

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