



## 影响钢轨疲劳裂纹萌生寿命的主要因素分析

### Main Factors Analysis of Influence on RCF Crack Initiation Life in Rails

投稿时间: 2008-6-23 最后修改时间: 2009-5-14

DOI: 稿件编号: 中图分类号: U213.4

中文关键词: [钢轨](#) [滚动接触疲劳](#) [裂纹萌生](#) [静水压力](#) [临界平面](#)

英文关键词: [rail](#) [rolling contact fatigue](#) [crack initiation](#) [hydrostatic stress](#) [critical plane](#)

作者	单位	E-mail
<a href="#">王建西</a>	<a href="#">同济大学交通运输工程学院城市轨道交通与铁道工程系</a>	<a href="mailto:qianxi-2008@163.com">qianxi-2008@163.com</a>
<a href="#">许玉德</a>	<a href="#">同济大学交通运输工程学院城市轨道交通与铁道工程系</a>	

摘要点击次数: 3 全文下载次数: 1

#### 中文摘要

建立了钢轨3维弹塑性有限元计算模型,分析了接触斑内应力应变场特点。分析结果表明在接触斑内钢轨处于三向压缩应力状态,有较大的静水压力;认为静水压力影响滚动接触疲劳裂纹萌生寿命。以临界平面法为基础,提出了考虑静水压力影响的滚动接触疲劳裂纹萌生寿命预测模型,分析了轮载和摩擦系数对疲劳裂纹萌生的影响。结合具体算例分析表明:随着静水压力增大,静水压力对滚动接触疲劳裂纹影响在增大;随着轮载和摩擦系数增加,滚动接触疲劳裂纹萌生寿命迅速减少。

#### 英文摘要

In order to analyze the stress-strain field characteristics in rails, a three-dimensional elastic-plastic rail model was established by finite element method. The results showed that the stress-strain field in rail at the contact patch was three compression stress state, with much greater hydrostatic stress. Rail rolling contact fatigue (RCF) crack initiation life is very sensitive to hydrostatic stress. Based on the critical plane approach, a new prediction model was proposed to consider the effects of hydrostatic stress on the rolling contact fatigue crack initiation life. The effects of wheel load and friction coefficient were analyzed by the model. U71Mn rail steel was investigated in detail to validate the proposed approach. The results show that, as hydrostatic stress increases, the effects of hydrostatic stress on the rolling contact fatigue crack initiation life become greater and as the wheel load and the friction coefficient increase, fatigue life to crack initiation decreases significantly.

[查看全文](#) [查看/发表评论](#)

您是第278837位访问者

版权所有《同济大学学报(自然科学版)》

主管单位:教育部 主办单位:同济大学

地址:上海四平路1239号 邮编:200092 电话:021-65982344 E-mail: [zrxb@tongji.edu.cn](mailto:zrxb@tongji.edu.cn)

本系统由北京勤云科技发展有限公司设计