

论文

井下煤矸分离机弹性筛面变直线振动筛的研究

杜长龙, 江红祥, 刘送永

中国矿业大学 机电工程学院, 江苏 徐州221008

摘要:

为克服目前井下煤矸分离机筛分效率低、出料难等问题, 提出一种用于煤矸分离机的弹性筛面变直线振动筛。基于拉格朗日法建立了振动筛的五自由度振动模型, 获得筛面上任一点的运动学方程, 基于此, 进行了激振力位置和方向角对筛面运动行为和抛射物料强度影响的研究, 并确定激振力作用位置和方向角最佳区域分别为 $-0.11 < x_f < 0.04$ m, $30^\circ < \theta < 50^\circ$ 。根据理论和试验测得的筛面上任一点的运动轨迹证明了所建动力学模型的正确性, 并且振动筛试验样机能够实现煤矸混合料的高效分离, 说明激振力位置和方向角区域的合理性。研究结果为弹性筛面变直线振动筛的设计研究提供了理论依据, 提高了井下煤矸分离机的筛分效率。

关键词: 煤矸分离; 振动筛; 变直线; 动力学模型

Research on variable linear vibration screen with flexible screen face of-separator for coal and gangue underground

Abstract:

A variable linear vibration screen with flexible screen face was put forward for separator of coal and gangue underground to overcome screening inefficiency and difficult discharge of the current separator for coal and gangue underground. The five degree of freedom vibration model was established with Lagrange method, and the kinematic equation of any point at screen face was obtained. The effects of shock force position and its direction angle on movement of vibrating screen surface and intensity of projection were investigated, and got the best range of shock force position and its direction angle : $-0.11 < x_f < 0.04$ m, $30^\circ < \theta < 50^\circ$. The movement of one point at screen face is compared with theoretical result and test result, it indicates that the model expressed is correct. The test prototype of vibration screen can screen coal and gangue mixture efficiently, which shows that range of shock force position and its direction angle is reasonable. These results can provide some scientific knowledge for designing and studying variable linear vibration screen with flexible screen face, and enhance the screening efficiency of separator for coal and gangue underground.

Keywords: coal gangue separation; vibration screen; variable linear; dynamics model

收稿日期 2012-05-31 修回日期 2012-07-14 网络版发布日期 2013-04-02

DOI:

基金项目:

江苏省高校科研成果产业化推进资助项目(JHB2011-31); 中国博士后特别资助项目(201104583); 江苏省博士后基金项目(1101106C)

通讯作者: 杜长龙

作者简介: 杜长龙(1958—), 男, 江苏徐州人, 教授, 博士生导师, 博士

作者Email: jdx3@cumt.edu.com

参考文献:

本刊中的类似文章

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(2247KB)
- ▶ [HTML全文]
- ▶ 参考文献PDF
- ▶ 参考文献

服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 煤矸分离; 振动筛; 变直线; 动力学模型

本文作者相关文章

- ▶ 杜长龙
- ▶ 刘送永
- ▶ 江红祥

PubMed

- ▶ Article by Du,Z.L
- ▶ Article by Liu,S.Y
- ▶ Article by Jiang,H.X