

عنوان مقاله:

Effects of Porous Parameters on the Aerodynamic Noise of the Blowing Device of Guardrails

محل انتشار:

دوماهنامه مکانیک سیالات کاربردی، دوره 15، شماره 4 (سال: 1401)

تعداد صفحات اصل مقاله: 14

نویسندگان:

M. H. Zhang - *Department of Mechanical and Electronic Engineering, Shandong University of Science and Technology, Qingdao, ۲۶۶۵۹۰, China*

H. J. Shi - *Department of Mechanical and Electronic Engineering, Shandong University of Science and Technology, Qingdao, ۲۶۶۵۹۰, China*

خلاصه مقاله:

To solve the problem of the strong noise generated in the galvanizing process on the surface of the guardrail board, optimal design of the outlet structure of the blowing device is carried out according to the sound absorption and noise reduction theory of microperforated plates. The aerodynamic characteristics and aerodynamic noise analysis of the blowing device are investigated by large eddy simulation with dynamic grid technology. The oblique surface of the outlet is processed with blind holes, and then the influence of blind holes on the aerodynamic noise of the blowing device is explored, including different shapes, porosities and depths. The spectral study reveals that when the guardrail board just enters the blowing device, there is greater noise compared to other working conditions. The place with the highest noise sound pressure level (SPL) is at the outlet of the blowing device at the monitoring point of $R=1$ m and the direction of 90° . The SPLs of the monitoring points at 0° and 180° are smaller than those in other directions, while the SPL distribution of the monitoring points in other directions is relatively even. Compared with the original blowing device, the best noise reduction performance is achieved when the blowing device has cylindrical holes, with a porosity of ۱۰% and a hole depth of ۳ mm. The noise reduction value reaches up to ۲۸.۴ dB. In addition, an aerodynamic noise test was carried out on the blowing device in the corrugated board galvanizing workshop to demonstrate the correctness of the results of the numerical simulation.

کلمات کلیدی:

Blowing device, Impinging jet, Aerodynamic noise, Porous parameters, Brand noise reduction

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