

消除粮仓通风死角的新构想及其电流场模拟试验

A New Concept About Removing Dead Space of Ventilation in Granary and Its Electric Field Simulation

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中文摘要:

通风槽干燥仓在我国被广泛采用,它是一种地面开有通风槽的矩形平底粮仓,采用正压通风,这种通风方式存在通风死角,导致局部粮食霉变。该文提出消除这种通风死角的新构想,其原理是利用正负压通风与正压通风两种气流场在空间分布上的互补性,将这两种通风方式交替采用,实现无死角通风。根据粮堆机械通风时,谷料中的气流场与均匀导电媒质中的恒定电流场相似,均满足拉普拉斯方程,因此,可以用电流场模拟粮堆机械通风时的气流场。模拟试验表明,在相邻两风槽间的距离与粮堆高度为不同的比值时,正负压通风的气流场可复盖正压通风的死角,从而证实了新的构想的可行性。这种新的通风方式不仅可用来改造现有的通风槽干燥仓,而且对今后新建粮仓的通风设计也具有重要参考价值。

英文摘要:

Granary with ventilation troughs, as widely used in China, is a kind of granaries with rectangular flat base ventilation troughs built on the ground, and positive pressure ventilation is generally adopted. This kind of ventilation scheme always generates a prism-shaped dead space of ventilation close to the ground in between the two neighboring ventilation troughs, causing the grain in this area go mouldy. In this paper a new concept of removing this dead space of ventilation is presented. Positive pressure ventilation and positive-negative pressure ventilation are adopted alternately. Electric current field simulation is used to demonstrate that under different ratios of the distance between two neighboring ventilation troughs to the height of the grain heap the dead space of ventilation can be effectively covered by the airflow field created by positive-negative pressure ventilation scheme. This new kind of ventilation scheme can be adopted not only in reforming the existing granaries with ventilation troughs but also in designing the ventilation system of future granaries.

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