

Influence of elevator moving pattern and velocity on the airflow  
uniformity for an LCD panel delivery facility

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Abstract

Abstract—Owing to the increasing LCD panel size, the difficulty on delivering the glass substrate has been enhanced dramatically and become a critical problem in the LCD manufacturing industry. Nowadays, most of panel fabrication factory utilize the fully-automated delivering technology instead of the traditional labor delivery for diminishing the possibility of polluted particles on the LCD board. Thus, this study intends to investigate on maintaining the air quality inside the delivering facility with a moving elevator. Also, special emphasis is focused on the influence on the moving pattern and velocity of the elevator via numerical technique. Firstly, CFD code Fluent is used to execute the transient flow simulation and evaluate the flow patterns inside this delivery equipment. From analyzing the calculated results, it is found that the inferior air is generated mainly by the increasing vortex inside the delivery equipment for an upward-moving elevator. On the contrary, the flow field becomes very smooth without obvious vortex phenomenon, and thus induces a better air quality when the elevator moves downward. However, a better uniform flow field occurred when the elevator is moving upward. In addition, the airflow uniformity is not effectively improved by reducing the elevator velocity and increasing the FFU airflow velocity. It is concluded that the moving pattern of elevator has an essential impact and can be utilized to improve the air quality inside the LCD delivery facility.

Keyword : Delivery Facility, LCD, Transient Simulation, Vortex