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Focus on IFA's work

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Model of ideal room ventilation

Problem

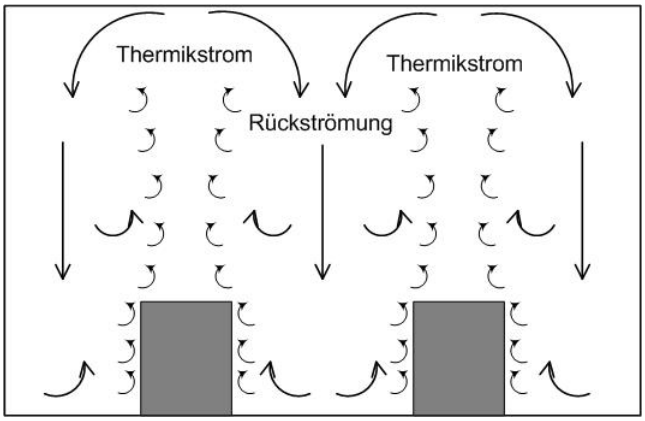
Requests from enterprises for advice from the IFA on ventilation issues have repeatedly shown that elementary principles governing the formation of air currents in production or work shops are frequently not observed during the planning and engineering of ventilation systems. Where shops contain machines which are operated at a surface temperature higher than that of the surrounding air, rising thermal currents are created (see Ills.). These must harmonize with the currents produced by the ventilation system if they are not to disrupt the exhaust of hazardous substances and atmospheric pollutants.

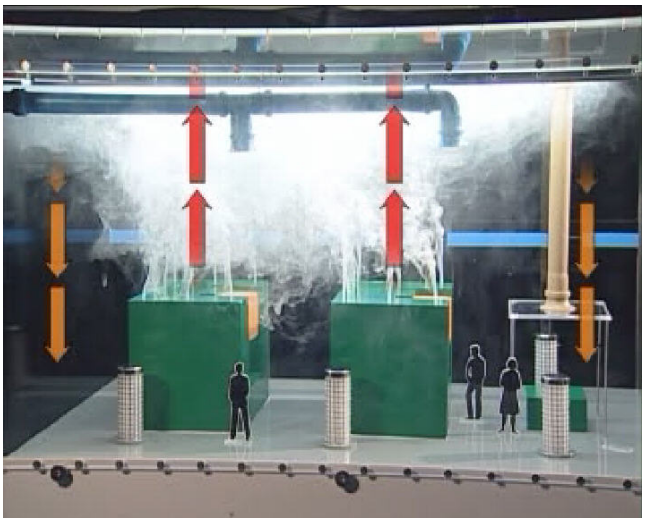
Activities

In order to present the issues comprehensibly during training measures and in advice to enterprises, a ventilation model was developed and a film with soundtrack produced which demonstrate air currents by means of theatrical fog and illustrate the errors and benefits of incorrect and proper ventilation respectively.

Results and Application

The ventilation model and the film show different ventilation situations, such as a circulating airflow generated by thermal currents. A circulating airflow cannot be prevented by exhaust of the thermal flows in ceiling areas alone.





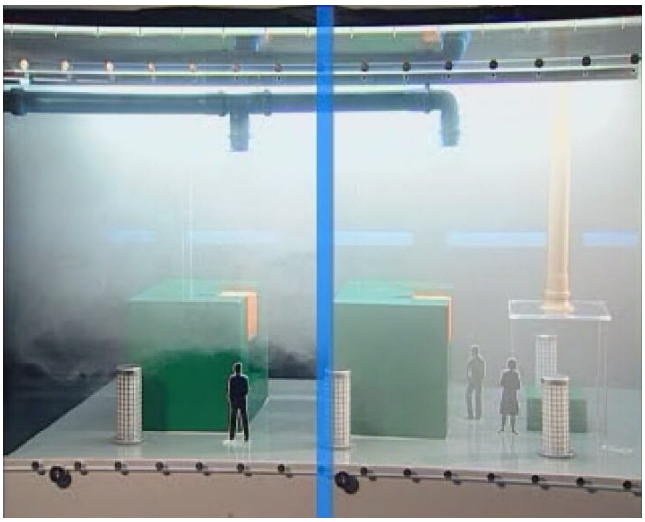
Thermal currents in an area containing sources of heat

Inappropriate routing of the fresh air may equally favour the return flow of air, for instance when the fresh air is routed into the room from the ceiling or the side.

The result is that rising smoke or hazardous substances are distributed throughout the room, even reaching floor level (mixed-flow ventilation).

In order for return flows to be reliably prevented, the air rising in the thermal current must be exhausted in the ceiling region, and replaced in the floor region in order for the pressure to be equalized. In this ventilation arrangement (displacement ventilation), the fresh air is supplied in a way which does not disrupt the thermal currents, and the air in the working area is displaced by fresh air. Displacement ventilation has proved effective over many years as an alternative to mixed-flow ventilation.

The illustration below shows images from the film presenting the comparison between the recommended displacement ventilation (left) and conventional mixed-flow ventilation (right).



Area of Application

Trade and industry, HEVAC businesses, consultants, training institutions

Additional Information

- Detailed information on the ventilation principle and the film can be downloaded from: www.dguv.de/ifa Webcode: d13443 (in German only)

Expert Assistance

IFA, Division 3: Hazardous substances: handling protective measures

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