

TYPICAL AIRFLOW PATTERNS WITH MULTIPLE CEILING FANS

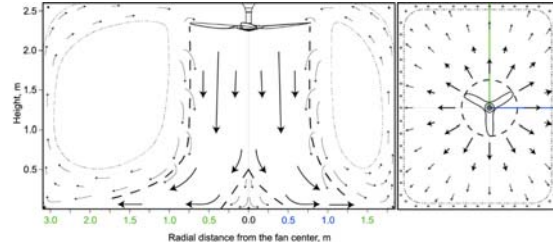
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OBJECTIVE & METHODOLOGY

- ⊕ To investigate the impact of ceiling fans mutual interaction, rotational speed and distance on air speed fields
- ⊕ To develop typical room airflows patterns for fan manufacturers, designers and researchers to improve the location of fans
- ⊕ To validate high spatial air speed measurements

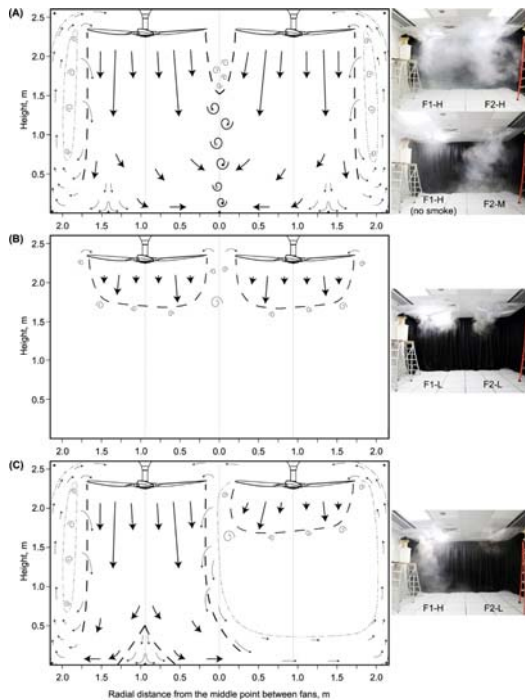
→ We did tests for different center-to-center distances between fans ($1.3xD$, $1.7xD$, $2.1xD$) and four speed set-points for each fan (turned off – 0, low speed – L, medium speed – M and high speed – H).

→ We compared results with typical air circulation pattern for single-fan room

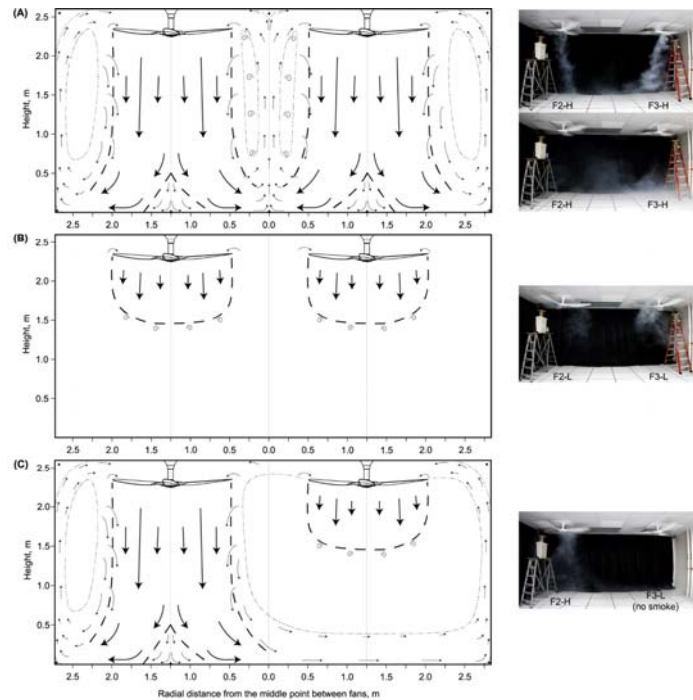


Air circulation in the single-fan room: cross-view across longest (green) and shortest (blue) distance to the wall (left) and plane view (right)

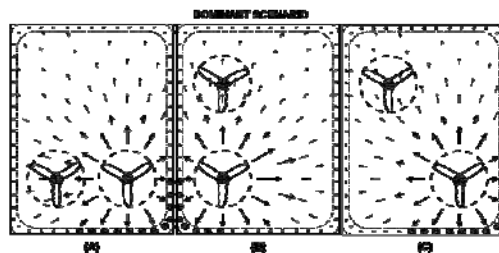
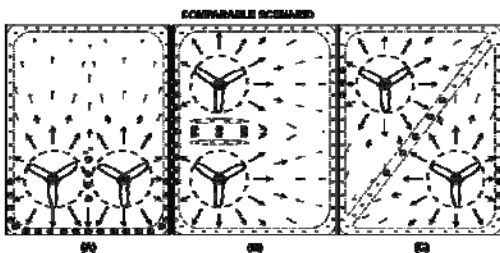
RESULTS



Air circulation in the double-fan room at the shorter center-to-center distance ($1.3xD$) – cross view at: A) comparable scenario at medium-/high-speed levels (M-M, H-M and H-H); B) comparable scenario at low-speed level (L-L); C) dominant scenario (M-L and H-L).



Air circulation in the double-fan room at the shorter center-to-center distance ($1.7xD$) – cross view at: A) comparable scenario at medium-/high-speed levels (M-M, H-M and H-H); B) comparable scenario at low-speed level (L-L); C) dominant scenario (M-L and H-L).



Air circulation in the double-fan room – plan views at the 0.5 m: (A) $1.3xD$; (B) $1.7xD$ and (C) $2.1xD$. Comparable scenario refers to cases when performance of both fans is relatively similar, while dominant scenario to cases when fan with higher speed level has a commanding position over the weaker fan.

Detailed results of air speed measurements with different visualization and scales are available online:



SINGLE FAN ROOM



DOUBLE FAN ROOM

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