

Title:

A new ventilation control for inverter driven jet-fans

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ABSTRACT

A new control system for tunnel ventilation fans is proposed. Designated FCVC (Feed-forward, Cascade-feedback, Ventilation Control), it is especially well suited to controlling variable-speed fans such as inverter-driven jet-fans, but it also has benefits for driving fixed-speed fans. It has the special advantage that the emergency control mode is a permanent sub-set of the routine control mode, thereby effectively guaranteeing availability in an emergency.

In routine operation, FCVC is a combination of feed-forward control based on predicted traffic conditions and feed-back control based on measurements of airflow velocity and visibility. These are combined in a cascade manner based on differences between measured and target conditions. In emergency operation, the traffic prediction and visibility modules are by-passed and control is based solely on differences between measured and target air speeds.

In this paper, the structure of FCVC is explained with special emphasis on the more general mode (i.e. routine operation) and consideration is given to matters related to the practical application of the system in real tunnels.

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