

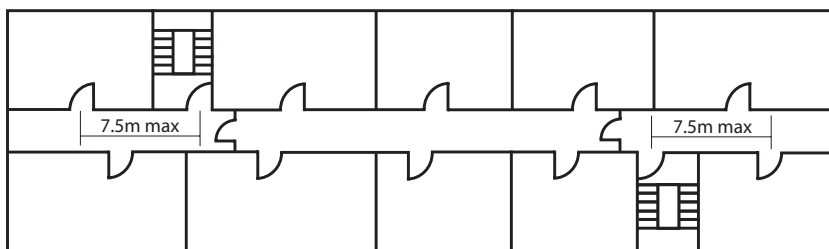
The Colt Extended Corridor System

Extending travel distances in means-of-escape corridors

Colt has developed a new Extended Corridor System for means-of-escape corridors in residential buildings. This system offers developers substantial space and cost saving benefits, while providing a safe evacuation route. Colt's Extended Corridor System also aids fire fighters by allowing the corridor to be cleared of smoke rapidly, even during the later stages of a fire, when a conventional system might well be overwhelmed.

THE CONVENTIONAL APPROACH

Approved Document B (Fire Safety) recommends that where there is a dead-end corridor the travel distance from the dwelling door to the staircase is limited to 7.5m. A typical layout is shown pictorially below.

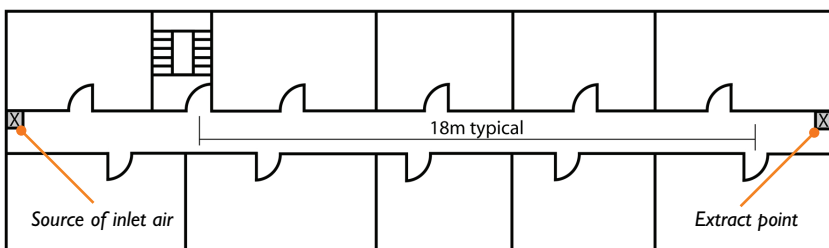


The implication of this is that for many building configurations more than one staircase is required.

THE COLT EXTENDED CORRIDOR SYSTEM

Colt has developed an alternative mechanically ventilated solution that:

- Allows safe escape conditions to be maintained in the corridor, even when the travel distance is extended by a factor of 2 or 3 in one direction. In one recent instance, the travel distance was extended from 7.5m to 18m, thereby removing the need for an additional staircase, freeing up typically as much as 38m² of additional saleable or lettable space.
- Out-performs the conventional solution for both evacuation and fire-fighting, when the volumes of smoke could be much greater.
- Is generally unaffected by external wind pressures, so is inherently more reliable.



Colt has achieved this exceptional smoke extraction performance by designing both a mechanical corridor extraction system at one end of the corridor and a dedicated air inlet system at the other. Inlet air prevents the corridor from becoming excessively depressurised, which could make it difficult for evacuees and fire fighters to open doors, as well as causing extract fans to stall, resulting in total system failure.

Furthermore, a mechanical extraction system has the benefit that it is unaffected by positive wind pressure. The performance of an AOV system is heavily wind-dependent, and it can be totally ineffective under adverse wind conditions.

IMPROVED EFFECTIVENESS

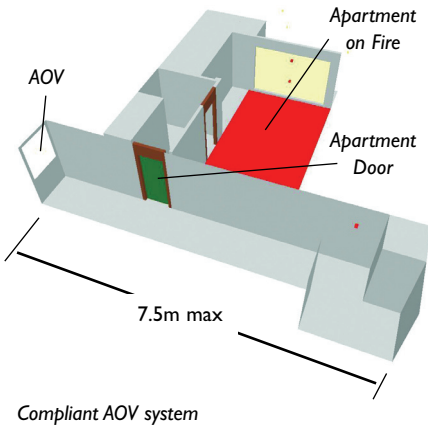
Colt has carried out extensive CFD modelling in both escape and fire-fighting modes, and compared the External Corridor Solution with a compliant corridor that has a natural AOV system. Zero wind was assumed to provide design conditions for the AOV. The layouts of the two alternatives are shown here.

Extended Corridor System

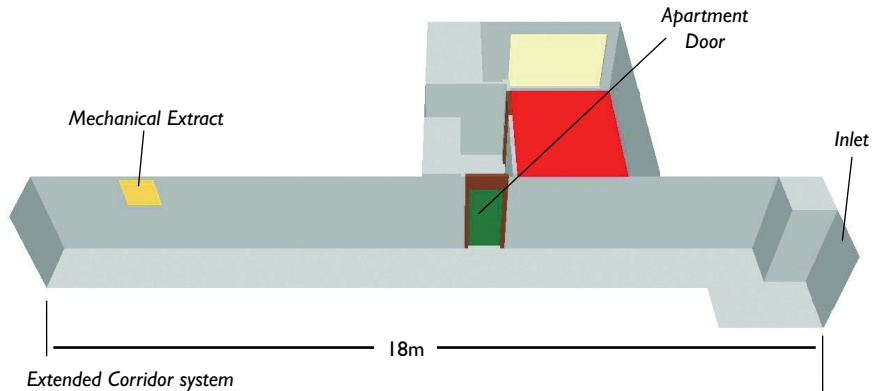
This modelling shows that in the early stages of the fire, the two systems perform satisfactorily. The fire starts in an apartment, the occupants evacuate and smoke spills into the corridor. Both the AOV and the mechanical system keep

clear conditions for evacuation although a ceiling smoke layer hangs around with the AOV. At this stage, the fire is relatively small. Ten minutes later, when the fire brigade open the apartment door, the fire is much more severe. Large volumes of

smoke spill out, completely filling the corridor, and the AOV system is overwhelmed. However, once the apartment door is closed, the mechanical system can clear the corridor within 60 seconds.



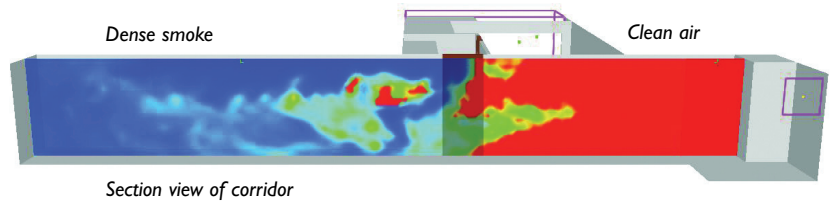
Compliant AOV system



Extended Corridor system

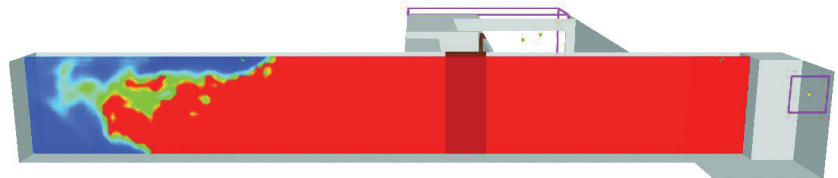
Extended Corridor System

This CFD screen-grab shows visibility in the corridor. Red denotes the greatest visibility distance, blue shows the least visibility distance. Just 30 seconds after the apartment door closes, the Colt Extended Corridor System is well on its way to clearing the corridor.



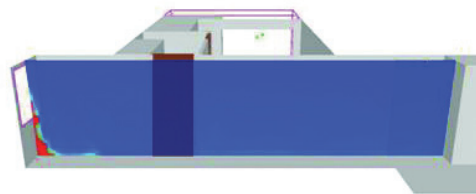
Section view of corridor

Despite the fact that the corridor is more than twice the length of the compliant corridor, the corridor is almost completely cleared of smoke within 60 seconds of the apartment door closing.



Conventional approach

After the same amount of time in the corridor equipped with a conventional AOV, the visibility is almost zero - the corridor is still completely smoke logged.



This series of screen grabs show the situation in the corridor during this final phase.

A video of these CFD simulations working dynamically may be viewed at www.coltinfo.co.uk.

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Colt International Limited

New Lane Havant

Hampshire PO9 2LY

Tel +44(0)23 9245 1111

Fax +44(0)23 9245 4220

info@coltgroup.com

www.coltgroup.com