

## Fire Engineering Design

### Crowd Behaviour >

The evacuation time for buildings is a key safety requirement. The balance between - the location and number of people; the location & width of exits; and, the response time of individuals and groups all affect how long it may take to evacuate.

In larger or complex buildings a thorough understanding of the expected egress time is required to provide the optimum design solution. The following outlines our capabilities.

#### Aims >

- >Effective movement of occupants to a place of relative safety.
- >Investigation & removal of overcrowded exits and inefficient use of exits.
- >Optimum location of exits and stairs.
- >Integration of fire alarm warning systems and crowd management facilities.

#### Benefits >

- >Tailored egress design solutions including rationalised stair widths.
- >Minimisation of overcrowding or crowd surge.
- >Visualisation of the egress strategy with system performance communicated and agreed with approval authorities.

#### Tools >

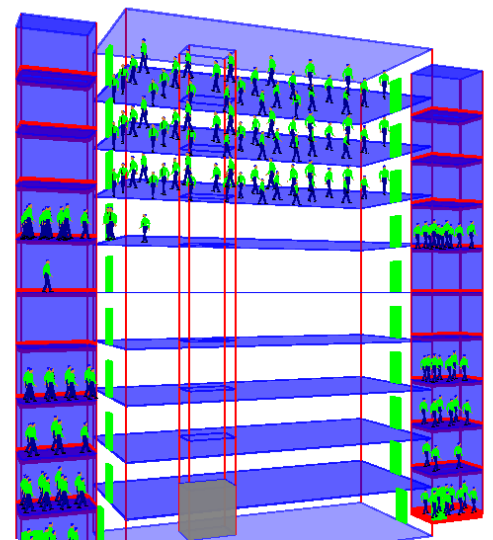
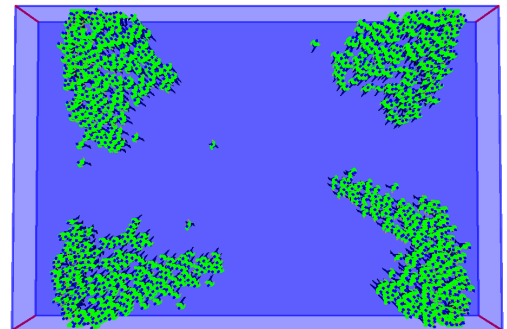
- >3D individual movement based egress models.
- >Detailed analyses of complex geometries.
- >Clear communication of the design to clients and approval authorities.
- >Simplified 'ball bearing' approach using in-house flow egress models.

#### Projects >



>Pavilions Swords Shopping Centre Phase 3

>Phoenix Park, Dublin: Robbie Williams Concert  
120,000 capacity



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