BASELINE DESIGNS FOR SECONDARY SCHOOLS - CIRCULATION MODELS

The EFA created models of typical circulation patterns in the baseline secondary schools to identify any pinch points or locations where overcrowding may occur. Where crowding was predicted, changes to the design were made.

The following ‘worst case’ scenarios were modelled for each baseline design.

- Class Interchange: looking at the capacity of the circulation routes and stairs - based on the most likely movement patterns - when all pupils transfer from one classroom to another within a five minute period.

- Lunchtime circulation: looking at the capacity of the circulation routes and stairs when pupils move from classrooms to the dining area; and whether there is sufficient space to queue as well as walk through the dining zone.

An origin/destination matrix was created to identify which routes are likely to be the most heavily used, based on the shortest distance for each journey. The capacity of each route was then assessed at the narrowest point (the pinch point) to show how many people can comfortably walk along the corridor or stair each minute. A more restrictive scale was applied to stairs compared to the ones used for corridors, as speed is lower and it takes longer to move down the stairs.

Assumptions - Both Models

- All staircases are available for use and pupils will use the staircase closest to the classroom from which they originate.
- The ‘clear width’ of a circulation route was taken as 0.4m less than the actual width between walls, to allow for the fact that people do not walk along touching the walls ‘the edge effect’.
- The clear width for stairs was taken as the width between hand rails.
- Use of the lift, visits to the toilet and lockers and staff movements are all excluded as these will be negligible in the scenarios modelled.
- Each pupil takes up an ellipse 0.6m wide and 0.45 deep (based on an adult male).

Assumptions - Class Interchange Model

- All pupils change classrooms within a 5 minute time period.
- Demand is evenly distributed throughout the 5 minutes.
- There are no lockers or other corridor obstructions.
- There are no queues outside classrooms as teachers will always be present to let pupils in. However, an assessment was also made of the space available to queue in order to understand whether there is sufficient space for queues and movement in the corridors.

- All teaching spaces are used to 100% capacity. In reality, pupils would utilise 75% of available workplaces at any one time, with 87% average frequency of use of rooms and 87% average occupancy of rooms. Therefore any borderline or fail 100% results were checked at a 75% use level.

Assumptions - Lunchtime

- At the lunchtime bell all pupils leave their classrooms, 10% go to the library, 33% go immediately to the dining area and the rest go outside, then to the dining area later in the lunch hour.
- If it is wet, pupils travel to the hall and certain classrooms rather than outside as they wait for their lunchtime seating.

In practice, circulation patterns and crowding in the school are determined by the detailed timetable and operation of the school. This includes management strategies such as the use of bells and whether or not queuing is allowed outside classrooms.

These models looked at circulation flow; means of escape requirements also had to be addressed, see ‘Fire safety & protection strategy’.