

CASE STUDY



BRISTOL AIRPORT | AIRPORTS

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Handling more than five million passengers a year, Bristol Airport is a major regional airport and it has ambitious plans to increase the amount of traffic it handles to 10 million per annum by 2019/20. To enable it to do this, the airport is undergoing a substantial redevelopment programme and FDS Consult was brought on board to apply its innovative approach to fire engineering to the first phase of this renovation project, drawing on the team's considerable experience of airport environments worldwide.

The project involved changes to the existing internal layout of the terminal building along with the construction of an external walkway to enable passengers to walk to departure gates rather than being transported to aircraft from the terminal building by bus. FDS Consult's expert team was given the remit of developing the fire strategy for both the refurbished building and the new walkway and of devising an evacuation strategy that would maximise safety across both elements of the building whilst addressing business continuity and security issues.

Fundamental to the fire design of both elements of the project was the land side/air side compartmentation strategy that FDS Consult's experienced approach enabled the team to deliver. This ensured that, in the event of a land side fire, only pre-security clearance passenger traffic would need to be evacuated, enabling flights to leave on a business as usual basis. Similarly, an air side evacuation would ensure that check ins could proceed as normal and, critically for security, if the whole airport should need to be evacuated, the land side and air side passengers would remain separate. FDS Consult also contributed to the airport's business continuity planning by specifying an isolated alert fire alarm system, enabling airport staff to verify whether an incident is a genuine fire or a false alarm before evacuation is initiated and fire crews are sent in.

In the terminal building, the airport's initial plan had been to install sprinkler systems across all areas but this would have had significant cost and space implications. FDS Consult successfully argued that sprinklers would not be necessary in the main circulation areas of the terminal building as the large floor to ceiling heights would provide plenty of time for safe evacuation and fire service access before smoke levels became untenable. As a result, sprinklers were specified for retail areas only, providing significant cost savings and enabling the airport to increase revenues by regaining useable space. FDS Consult's value engineering expertise also allowed the airport to regain useable space by strategic positioning of fire fighting shafts throughout the building which reduced the number of shafts required.

The redesign of the terminal building's interior layout meant that an existing staircase was an impediment to the free movement of passenger traffic. The FDS Consult team was able to use its experience of airport traffic and knowledge of international standards to demonstrate that, according to the US standard, occupancy loads would be acceptable if the staircase was removed and the walkway could be used as an alternative escape route, justifying removal of the staircase.

The external walkway is a glazed, stilted construction providing passengers with access to eight gates. FDS Consult had to apply its creative and technically advanced approach to fire designing the structure to overcome issues with travel distances, exit widths, fire risk and structural concerns in the event of a fire. FDS Consult was able to address all these concerns by:

- Justifying the extended travel distances within the walkway by demonstrating that this area was a circulation route and that passengers could quickly and easily escape to a place of relative safety
- Accurately calculating the occupancy loads for each gate thereby justifying exit widths
- Using radiation analysis computer modeling techniques to estimate the effects of a fire at the airport's fuel farm to prove that the walkway was at a safe distance from the fuel farm, thereby avoiding specification of expensive fire-rated glazing
- Using Euro Code Calculations to consider the potential fire size against the level of ventilation and smoke and heat dissipation due to the glazed nature of the structure to justify reduction in the level of fire resistance required
- Establishing, with the help of CFD Modelling, that the maximum temperatures experienced by the steel glass fittings would be around 200°C thereby proving the integrity of the fixings in the event of a fire and avoiding specification of additional protection.

Owing to FDS Consult's innovative approach to fire engineering, Bristol Airport was able to increase travel distances, reduce exit widths, minimise fire rated protection and implement an evacuation policy that would maximise safety, security and business continuity whilst also achieving significant cost savings.

