

Information Paper

External fire spread

Supplementary guidance to BR 187 incorporating probabilistic and time-based approaches

Sung-han Koo

During the revision of BRE Report BR 187 (*External fire spread: building separation and boundary distances*)^[1], it became apparent that the methodology and some of the assumptions may not be valid for some features in modern buildings. This Information Paper therefore reviews existing fire compartment temperature calculation methods and presents methodologies for assessing the sensitivity of the parametric approach to variations in fire load, window size and insulation of compartment boundaries. Analyses on how these changes affect the building separation distances are summarised. In addition to the current 'steady state' assumption inherent in BR 187, probabilistic and time-based approaches are also considered.

The parametric temperature–time curve has been used to illustrate the sensitivities of the separation distance calculations to the different variables and how these might be considered as part of an overall engineering design solution. The selection of the fire compartment temperature calculation method is a key element and approximation in any such approach, which would need to be validated and justified by the fire engineer for the specific design under consideration.

This Information Paper is intended to provide guidance to engineers who wish to take alternative fire engineering approaches when calculating building separation distance and to assist them to make judgements on which elements of design they need to focus on.

Introduction

Some of the earliest fire safety legislation was put in place to reduce the possibility of fire spread between buildings, which could lead to major urban fires. Controls were placed on the width of streets, the materials that could be used on the external surfaces of buildings and the activities that could be carried out in the buildings. The failure of such legislation (resulting in major urban fires around the world) has been due to poor enforcement or the introduction of new building methods or materials that were not considered by the legislators.



In England, Approved Document Part B (*Fire safety*)^[2, 3] refers to BR 187 for the detailed calculations that may be required for determining building boundary and separation distances to prevent fire spread between buildings. During the 2014 revision of BR 187, it became apparent that the methodology and some of the assumptions, which were developed 50 or more years ago, may not be valid for some features in modern buildings, notably very large spaces and high levels of thermal insulation. The fire performance of glazing in modern buildings may also be different. While combustible cladding on the exterior of a building is taken into account, external flames from a flashed over compartment in a building are not considered in the current methods. There are indications that the current methods may provide separation distances that are too small for very highly insulated buildings (increasing the likelihood of fire spread) but provide excessive separation distances for very large enclosures with a low fire load (being unduly onerous on the designer).