



Occupant interactions with self-closing fire doors in private dwellings

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ABSTRACT

Prevention measures to reduce deaths and injuries due to domestic fires have included the provision of self-closing fire doors within dwellings. Such an approach however, is reliant on a behavioural response on behalf of the occupier(s). This research examined occupier behaviour in relation to self-closing fire doors. Forty semi-structured interviews were conducted with individuals inhabiting a new home. In all of the properties with self-closing fire doors, the occupants reported interfering with the self-closing mechanism of the doors. A quantitative survey was subsequently undertaken to obtain frequency data. In the majority of dwellings with fire doors occupiers reported propping these open in some way, or removing the self-closing mechanism from the door. The accounts suggest that, for fire doors to be an effective safety measure within dwellings, a greater emphasis needs to be placed on encouraging occupiers to adopt safe practices in relation to fire doors. Alternatively, other measures will need to be found to address the fire risk.

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1. Introduction

Deaths and injuries arising from dwelling fires are a cause for concern within the UK. Every year, almost 400 people are killed and over 10,000 injured as a result of a domestic fire. Current, yet provisional, data from the Department for Communities and Local Government (DCLG) suggests that in the year ending 30th June 2008, Fire and Rescue Services attended a total of 760,000 fires or false alarms within the UK (DCLG, 2009). Of these, 42,000 were accidental dwelling fires (DCLG, 2009). In the same period, 352 deaths occurred and 10,400 injuries were sustained as a result of a domestic fire (DCLG, 2009). The effects of fire can cause serious disruption to domestic life through the loss of personal belongings and damage to the home. In 2006, the average cost of a domestic fire in the UK was estimated at £24,900, of which approximately £14,600 was considered to be the economic cost of injuries and fatalities and £7300 was due to property damage (Office of the Deputy Prime Minister [ODPM], 2006).

Reducing the incidence and severity of unintentional injuries sustained within the home is a public health priority (Department of Health, 2003) and various preventative measures targeting unintentional injuries have been introduced. 'Primary' interventions are engineering approaches which attempt to eradicate human factors from a situation and rely on structural or environmental modifica-

tion. A number of primary prevention measures have been incorporated within the UK building regulations, for example the installation of fire doors within dwellings to protect against the effects of fire. 'Secondary' prevention strategies attempt to modify an individual's behaviour, and as such, focus on the beliefs, attitudes and behaviours of individuals. Neither of these approaches however considers the interaction that may arise between behaviour and the environment.

Heimplaetzer and Goossens (1991) argue that many primary solutions aimed at preventing unintentional injury within the home have been chosen on the basis of partial or incomplete modelling of these solutions. For example, in preventing children falling down stairs a closure may be fitted at the top of a flight of stairs, but the consequences of this modification for other occupants is overlooked. In this manner, safety measures introduced to protect occupiers from one element of danger can introduce additional hazards within the home. Indeed, Pickett (2003) highlighted the finger-trapping hazard created by self-closing fire doors within three storey dwellings on a new development in Bristol, whereby the self-closing mechanism on the door applied a continuous force until the door hit the latch. Pickett recorded that over 700 internal self-closing fire doors had been fitted in 64 dwellings on the development. He reported that over 30,000 domestic incidents of finger-trapping occur annually and concluded that as more properties were occupied there was further potential for injury.

There is conflicting evidence in relation to the effectiveness of primary interventions as a sole method in reducing the number

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of injuries sustained within the home. This may be explained by the fact that some environmental modifications, such as the provision of smoke alarms, require a behavioural adaptation to ensure their effectiveness (Carlson-Gielen and Sleet, 2003). A behavioural adaptation is also required for the effective use of self-closing fire doors. The safety protection afforded by fire doors, for example, is negligible if they are wedged open or otherwise unable to close (Meacham, 1999). Following completion of a dwelling and the appropriate approvals necessary to meet the requirements of the building regulations, no further checks are undertaken within privately owned and occupied dwellings. The continued operation or existence of self-closing fire door devices is not monitored or controlled after installation (DCLG, 2007a) and, anecdotally, such monitoring in private dwellings is unlikely to be considered acceptable to the occupants.

A project commissioned by the Department for Communities and Local Government (DCLG, 2007a), sought to determine current levels of satisfaction and current practice in relation to self-closing fire door devices within the domestic environment. The DCLG report details the findings of their investigation and suggests that within the majority of those properties where self-closing devices are fitted to internal fire doors, users are likely to disable them to meet family needs (DCLG, 2007a). The findings from the DCLG project however, are based upon limited information; of the 550 questionnaires distributed, only 18 usable responses were returned. One proposed suggestion for this was a fear of reprisal amongst individuals responding to the study. In addition to this, little information was forthcoming from a number of local and national house builders and social landlords. Personal interviews with friends and family of investigators proved to be the most effective and reliable source of data (DCLG, 2007a).

A subsequent study commissioned by the DCLG and undertaken by a market research organisation found that, among those living in the types of property where self-closing fire doors would be expected, only one third reported that they have self-closing devices. This suggests that up to two thirds of occupiers do not realise that they have these items or that they have been removed in the past (Andrew Irving Associates, 2006a,b). These reports provide the only information available on householder interactions with self-closing fire doors; very little academic work has been published in relation to this topic.

Public antipathy towards such safety measures is could be due to the fact that the measures interfere significantly with the day-to-day convenience of occupants. In addition, differing perceptions of risk will continue to be a significant influence. Previous studies have identified that there are barriers to maintaining passive home safety measures (Stone et al., 2007; DiGuseppi et al., 2002) and it is important to establish these barriers in relation to fire door installation and maintenance.

In recognising the potential hazards created by fire doors and the inconvenience faced by occupiers the UK government initiated a consultation process where they were 'minded' to remove the need for self-closing devices within dwellings (ODPM, 2005). Following this, a revised edition of Approved Document B was published; with the requirements being effective from April 2007. This document states that '*other than doors between a dwelling house and an integral garage, fire doors need not be provided with self-closing devices*' (DCLG, 2007b). The provision of internal fire doors however remains a legal requirement. Furthermore, additional national and local Community Fire Safety programmes are planned to reinforce the fire safety benefits of closing these doors, particularly at night (DCLG, 2007a).

In the UK, the requirement for self-closing devices on fire doors was first initiated in 1972. Regulation E13(2) introduced, for the first time, a requirement to protect stairways in three storey houses with fire resisting construction and fire doors with Regula-

tion E11(5)b permitting the use of rising butt hinges as the self-closing device (HMSO, 1972). The requirement for self-closing devices on fire doors has therefore been a part of building regulations for almost 40 years until the recent amendment of Approved Document B. A considerable amount of the UK's housing stock would have therefore been subject to such regulations.

The anecdotal evidence suggesting interference with self-closing fire doors in dwellings (e.g. Pickett, 2003; DCLG, 2007a) is of particular importance when considering the emphasis now being placed on safety education and fire-protective behaviour within the home. A greater understanding of the ways in which occupiers interact with self-closing fire doors installed within their homes and the drivers for such behaviour would assist the development of safety campaigns aimed at promoting fire safety awareness. This would be of benefit to those occupying new homes where self-closers are not fitted on internal fire doors and also those occupying older dwellings where, for example, the self-closing devices have been removed. The aim of the present investigation therefore was twofold. Firstly to gain information on how occupier behaviour can interact with design features within the home including self-closing fire doors, and secondly, to quantify the extent to which self-closing devices may have been prevented from operating.

2. Methods

This research described in this paper was completed prior to the publication of the revised Approved Document B. The research was subject to and in compliance with the requirements of the Loughborough University Ethical Advisory Committee in relation to research with human participants. There were two phases to the research as follows:

2.1. Phase 1

Phase 1 was a qualitative study involving 40 face-to-face interviews with occupiers of new-build properties to elicit in-depth information in relation to occupier interactions within the home.

2.2. Sample

Participants from 40 properties were recruited to achieve a structure convenience sample. In total, 774 letters inviting participation were delivered to completed and occupied properties on new-build developments within the UK counties of Leicestershire and Nottinghamshire. All known new-build residential developments within a 20 mile radius of Loughborough University were targeted during the course of this research. The primary criterion for inclusion in this study was new-build occupancy within the previous 2 years. The final sample included a broad range of property types (detached, semi-detached, terraced, town house and apartment) built by both small and large commercial developers and reflected different types of occupancy status (owner occupier, tenant and shared accommodation).

2.3. Research design

A semi-structured interview schedule was prepared which contained questions in relation to individual experience of occupying a brand new home. One section of the interview schedule contained questions in relation to internal self-closing fire doors (Table 1). The interview schedule was piloted with two households before producing the final version.

Of the 40 semi-structured interviews undertaken, 27 were conducted with a single participant; either the sole occupier of the

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