

## Protection against fire: the fire officer's view

The London Fire Brigade have an extremely busy, full time team of professional fire investigators. The team attend about 2000 fires a year across London. As part of the Fire Safety Regulation department, the team seek to produce quality evidence to help improve public safety.

### Fires in plastic consumer units A pattern of fires emerges

Back in 2011, the Fire Investigation Team identified an increase in the number and severity of fires involving consumer units. The team started looking carefully at the cause of those fires and established that there were issues with high resistance connections, where cables were not secured properly. This had the potential to lead to localised heating, arcing and, in some cases, to fires. There was also an emerging problem due to a large batch (over 1 million units) of non-compliant miniature circuit breakers (MCBs), which were subject to a product recall and which could also fail catastrophically.

### Severe fires

The team were also seeing more fires that were spreading beyond the consumer unit and putting people's lives at risk. Through a careful process of laboratory examinations and tests at Brigade consultant scientists Bureau Veritas, concern was raised about the flammability of the plastic enclosures of consumer units. Working closely with Electrical Safety First, more extensive tests of five plastic consumer units from different manufactures were carried out in 2012. These tests gave significant cause for concern due to the intensity of the fire and the levels of toxic smoke produced.



*Testing of a small piece of plastic from a consumer unit with a heated 'hot wire'.*



*Note the strong flame and large amount of toxic smoke being produced from the small plastic sample.*



*A consumer unit test in progress - the fire rapidly burnt through mountings causing the test to be stopped.*

## Location, location, location

A significant cause for concern when a consumer unit becomes involved in a fire is that it is commonly located on an escape route, for example, under the stairs or behind the front door. When this is combined with the fairly usual situation of coats, outdoor wear and other household items being stored nearby, once the fire starts, it often develops very quickly. London Fire Brigade was becoming extremely alarmed at the number of injuries occurring at such fires and the need for people to be rescued as they became trapped when the escape route was involved in fire.

## A way forward

Working with Electrical Safety First, industry body BEAMA and other stakeholders, the process of presenting evidence for change began. A JPEL/64 project group was set up and 'robust' discussions about possible changes to BS 7671 (the Wiring Regulations) continued over several months.

Representatives from the Department of Communities and Local Government (DCLG) attended and raised concerns about possible changes. As a result of these concerns, DCLG commissioned independent tests at the Building Research Establishment (BRE). BRE tested two plastic and two metal consumer units and the subsequent report appeared to strongly support the need for change, stating:

*"Both plastic consumer units caught fire and their casings became involved in the fire"... ..  
"Both metal consumer units contained the fire within the unit" (Source: BRE report BD2890)*

Also, some manufacturers ran their own tests, the outcomes of which again demonstrated the need for change. This led to a new regulation to be included in Amendment No. 3 to BS

7671, effectively requiring consumer unit enclosures in domestic households to be manufactured from non-combustible material (such as steel) or to be enclosed in a cabinet or enclosure constructed of non-combustible material. This new regulation is a welcomed step-change improvement in fire safety.



*Following a fire under the stairs, the stair treads have burnt through, the ceiling has failed and the plaster has come off the wall.*



*This photo shows a fire involving a plastic consumer unit (bottom) and a metal consumer unit (top). In the experience of the LFB, when a fire originates within a metal consumer unit (even without sealed grommet holes and the plastic MCB cover failing), the fire is still generally contained to the consumer unit.*

## Wiring in escape routes

Fire and Rescue Services up and down the country have been acutely aware of this problem for some time, with cable entanglement directly or indirectly contributing to the death of 8 firefighters.

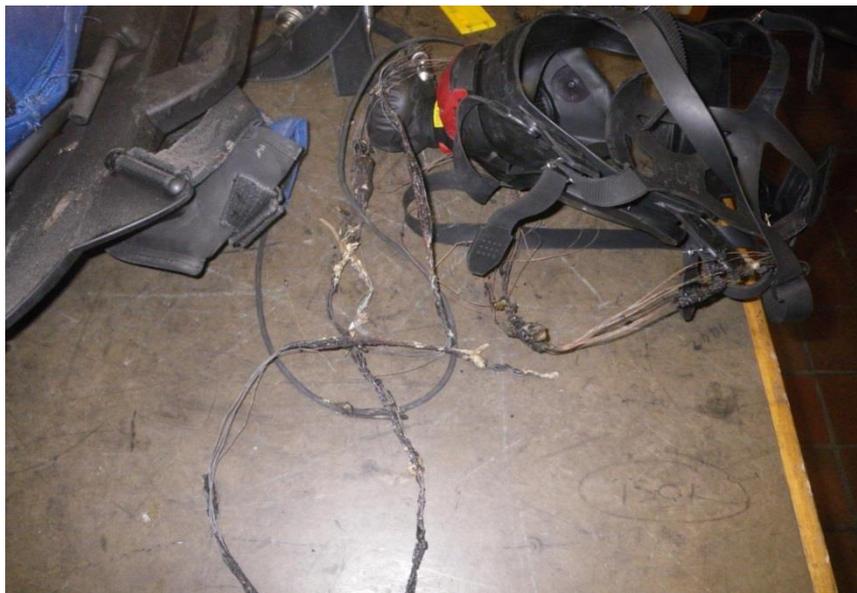
2005: 2 Firefighter deaths in Stevenage – the Coroner at the inquest stated that cabling and trunking contributed to their deaths and issued a 'Rule 43' report.

2007: 4 Firefighter deaths in Warwickshire – the Coroner stated that the failure of the trunking was a factor.

2010: 2 Firefighter deaths in Southampton – the Coroner reiterated the Rule 43 report from the 2005 case in Stevenage.

Firefighters enter buildings on fire to save life and reduce property damage, often working in intense heat, toxic smoke and with very poor visibility. To do this, they have to wear breathing apparatus and fire resistant clothing for protection. The problem has been that cables and plastic trunking have fallen from the ceilings at a very early stage during the fire's development, leaving the cables hanging. These cables have then become tangled around the firefighter's breathing apparatus, leaving them trapped and running out of air. Fire and Rescue Services such as London Fire Brigade have tried to reduce the risk to their firefighters by modifying the breathing apparatus and issuing firefighters with wire cutters, but this is only a 'best fix', it does not address the real issue.

The evidence that arose from such tragic incidents has been used to support change, which resulted in the new regulation in Amendment No. 3, requiring cables in escape routes to be adequately supported against their premature collapse in the event of a fire. The regulation precludes the use of non-metallic cable clips, cable ties or cable trunking as the sole measure of support. Firefighters have enough dangers to face without the additional risk of becoming entangled in dropping cables, so this new regulation is applauded.



*This photo shows a face mask of a London firefighter who had a lucky escape after cables got tangled round the face mask.*