

When changing behaviour is not enough

Having tackled many of the major causes of fires in the home, **Catherine Levin** considers whether changes to cooker tops could further improve household fire safety

We are looking for the next big thing. What can we do next to make a big difference to fire statistics? We spent ten years getting to a point where fire safer cigarettes were on the shelves. We put smoke alarms in peoples' homes; we changed the fabric on our furniture; and we keep telling people about fire safety. But still there are fires, injuries and fire fatalities. What can we do next? Is there anything we can learn from the US to help us get there?

Government fire statistics show that the largest number of injuries from fire occur in the kitchen and the biggest culprits are cooking appliances. Of the 8,930 recorded non-fatal casualties in dwellings in 2011/12, 4,100 of them were from accidental dwelling fires started by cooking appliances.

The US Fire Administration published a report in January this year that looked at cooking fires in dwellings for the period 2008-2010. It found that 'cooking was by far the leading cause of all residential building fires and accounted for 45 per cent of all residential building fires responded to by fire departments across the nation'¹.

Fire and rescue services have long focused on encouraging people to cook safely. Fire departments here in the US and in the UK focus on behaviour change through public education campaigns and through the efforts of their crews carrying out home fire safety visits. But what if you could change the environment? What if you could make a change to cooker tops so that if the heat level rises too high, the cooker switches off, or at least pauses, until the heat level goes down, reducing the possibility that the cooking will ignite?

This is not dependent on individuals and their cooking habits. Like fire safer cigarettes, it takes away the thinking and replaces it with manufacturer changes that could see the number of fires and injuries reduce over time.

Changing Cooker Top Technology

Doing something with cooker tops to prevent fires is not new or innovative thinking. There are many organisations in the US which have an interest in making changes to cooker top technologies and getting federal standards updated to include fire prevention measures. What follows is a potted history of work, which is by no means comprehensive, but gives a sense of the effort expended so far.

1. US Fire Administration Topical Fire Report Volume 13, Issue 12 / January 2013



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The US Consumer Product Safety Commission (CPSC) has been trying to convince standards-making bodies to change the standards for household gas and electric cooking appliances since the mid-1990s. One of the key standards is the ANSI/UL 858 standard for household electric ranges, with gas being covered by a separate standard.

The CPSC has sponsored many research reports evaluating technologies² and has demonstrated that technologies exist to limit temperatures of cook tops. In fact, in Japan, the literature highlights that solutions are in place. But so far there does not seem to be any consensus on a perfect technology in the US. Indeed, Vision 20/20, the IFE's US Branch sponsored project concluded as part of its work in this area that 'one size does not fit all'³.

So instead of focusing on a single technology, the focus is now on a performance test that could be integrated into the existing standards.

The International Association of Fire Chiefs (IAFC) Fire and Life Safety Section has recently done some work in this area. It published a report in 2012 which concluded that: 'The lack of progress on the very promising temperature limiting cooktop solution [referenced in a report commissioned by CPSC] has many similarities to the lack of progress that was made in developing a fire safe cigarette solution, both of which represent significant fire safety concerns. The fire safe cigarette problem was eventually resolved by a three prong approach involving development of a performance based fire test, a united fire service front, and legislative support. A similar approach might address this issue'.⁴

The National Institute of Standards and Technology (NIST), the federal agency that works with industry to develop and apply technology, measurements and standards, has worked with the research arm of the NFPA twice now, getting consultants from Hughes Associates to research, test and evaluate technologies.

Performance Test

The second project is ongoing and is intended to develop standard cooking scenarios, test methods and performance metrics to evaluate cooking mitigation technologies. The performance test developed by Hughes

2. Latest report is Development and Testing of Temperature-sensing-based control systems for electric coil element, gas and glass ceramic cooktops, August 2012.

3. Kitchen Fire Prevention Technologies Workshop Report, November 2010.

4. Protecting Life and Property and Reducing Injuries from Fires Originating in on Home Ranges. IAFC, January 2013.

Associates will work regardless of the technology used. It will look at detecting elevated heat levels, increased levels of smoke concentration and the production of gases from the cooking process⁵.

This is starting to sound remarkably like the story behind fire safer cigarettes. A standard was developed by ASTM, E2187 Test Method for Measuring the Ignition Strength of Cigarettes and it is this test method that is the basis for the laws requiring less fire-prone cigarettes in the US and other countries.

If CPSC, NIST and others can do the same for getting a test method for measuring performance of cooker tops, both electric and gas, which can form part of ANSI/UL 858, this too could be the basis for changes in US State laws. The legal change could require only cooker tops who meet the fire prevention standards to be sold to consumers as well as requiring retro fitting of cooker tops in certain types of dwellings, such as sheltered housing.

In Europe, countries were playing catch up to the US when it came to getting manufacturers to change their production processes for fire safer cigarettes. But this time it is the other way around – almost. Discussions at a European level about the problems caused by cook top fires in Europe started in 2005 but now there is a draft standard, BS EN 50615 Tests on Devices for Fire Prevention and Suppression for Hobs (cooktops), currently at public comment stage. It has been prepared by BSI Committee CPL/61/7, 'Safety of electrical appliances – heated appliance group'.

Electric or Gas?

Having read the draft many times, here's my take on it. The devices to prevent fires and suppress fires can be integrated into the cooker or can be fitted on to it. The draft has a general title that could apply to electric and gas appliances and the introduction says 'other EU Directives may be applicable to the devices within the scope of the standard'. And yet throughout the document it refers only to electrical appliances and is written by a technical committee that is focused on safety of electrical appliances. It is unclear to me whether gas hobs are included.

Much of the debate in the US seems to have been about heat detection and reduction of that heat, not about how to suppress the fire once it has started. BS EN 50615 includes suppression so UK fire and rescue services may have some concerns about that, given their stock in trade.

The test focuses on fire and yet does not include detection of smoke or gases, although the introduction does say this is under consideration. The Hughes Associates work detailed above does include detection of smoke and gases, so perhaps this is something for the technical committee to look at as part of this drafting process.

The BSI public comment period closes on 30 September 2013. Fire and rescue services in the UK can provide comments directly to BSI,

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where the draft is available from Geraldine Salt (geraldine.salt@bsigroup.com). A final published standard is not likely to see the light of day until 2015 at the earliest, and even then manufacturers will get a three year period of 'grace' to comply. However, submitting comments to BSI now will influence the standard and there is only a small window of opportunity to do so.

Current Solutions?

Given all this, what actually exists on the market to reduce the risk of cooking fires? One example is from a Canadian firm called Pioneering Technology which has developed the Safe-T-element cooking system. This is an electronically controlled solid cover plate that is installed on top of existing electric coil ranges. When the plate reaches just over 350°C/662°F the stove automatically shuts off and then as the plate cools to just below that threshold, the stovetop is turned on again.

Retailing at \$190 plus the cost of an electrician's installation fees, the Safe-T-element is currently installed in over 60,000 multi-residential housing units throughout North America. The company claims that the cost of a Safe-T-element retrofit 'is typically recouped within five years or less through savings on energy, insurance and maintenance costs'.

In the UK, East Sussex Fire and Rescue Service and local partners are trialing Stove Guard from the Finnish firm, Innohome, which retails at £120 plus installation costs. Stove Guard works on electric and gas cookers to alert the user when the heat from the hob reaches a pre-determined level. It is retro-fitted to a cooker by a qualified electrician or gas installer. When the heat level is not adjusted, Stove Guard will cut the power to the hob. Andy Reynolds, Director of Prevention and Protection at ESFRS and CFOA lead for electrical safety matters reported a positive initial outcome of the trial to CFOA's Home Safety Committee in December 2012.

In the US, it looks like the outcomes from the NIST/NFPA project to develop a standard performance test for fire mitigation may be the catalyst to get all interested parties working together to get changes made to ANSI/UL 858 and potentially its gas equivalent. Hopefully they will take a look at BS EN 50615 as part of this work. This will demonstrate that there truly is consensus in this field and that a change to the standard to include a test for fire mitigation can be made. It is this change that could lead to reduced numbers of injuries from fire in the home in the US in the longer term.

In the UK it is a critical time for fire and rescue services to get involved. The collective voice of the Fire and Rescue Service, CFOA and DCLG can influence the standards making process in the EU and make a real impact in reducing the number of fires and injuries from fire. Fire and rescue services in the UK need to be part of that three-pronged approach that the IAFC set out in January this year and make that difference.

⁵ For a very accessible article on this, look at NFPA Journal online for Front Burner by Fred Durso, July 2013.