

CPSC Staff Activities on Electrical Fires*

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Abstract

This presentation focuses on the U.S. Consumer Product Safety Commission (CPSC) staff's activities to reduce electrically caused fires in homes. Details of a 1980's fire investigation project and the resulting CPSC staff activities for addressing electrical fires are discussed.

Extended Abstract

The CPSC is an independent federal regulatory agency that was created in 1972 by Congress in the Consumer Product Safety Act. The mission of the CPSC is to protect the public against unreasonable risks of injuries and deaths associated with consumer products. CPSC uses several data systems to collect information on product-related incidents to identify and reduce hazards.

Fire incident data are used to support CPSC staff activities to reduce fire hazards associated with residential electrical wiring through proposals to voluntary safety standards and the *National Electrical Code (NEC)*. Fire incident data are also used to support compliance activities to seek corrective action for hazardous products and to develop material needed to educate consumers about the safe use of products.

Since extensive fires often destroy much of the evidence of fire origin, the CPSC sponsored a project in 1980 to identify the causes of residential fires involving electrical distribution systems. The U.S. Fire Administration was contracted to provide special training to fire investigators. The National Bureau of Standards, now the National Institute for Standards and Technology (NIST), analyzed available incident data. The NIST work documents 105 fire investigations in a report entitled *Analysis of Electrical Fire Investigations in Ten Cities*.ⁱ The CPSC study and report, *Residential Electrical Distribution Fires*,ⁱⁱ documented additional fire investigations for a total of 149 investigations.

Although the study did not use random sampling across a representative range to select incidents, it documented numerous examples of actual fires of electrical origin. The results revealed that a number of factors contribute to electrical wiring fires including: improper alterations, improper initial installation, deterioration due to aging, improper use, inadequate electrical capacity, and faulty products. The study also found that fires occurred at higher rates in older homes and that improper installation or modifications were key factors in the causes of many of the fires. From this study, it was concluded that a strategy of

* These comments are those of the CPSC staff and have not been reviewed or approved by, and may not necessarily represent the views of, the Commission.

inspecting existing installations and correcting conditions that may lead to hazards could be an effective means to reduce the potential for fires.

Following the CPSC study, CPSC staff worked with the National Fire Protection Association and industry members to develop NFPA 73, *Electrical Inspection Code for Existing Dwellings*, which is used in conjunction with the *NEC* (NFPA 70). NFPA 73 is intended as an inspection code and is only used as a guideline to correct hazards while the *NEC* is an installation code that is required in most jurisdictions.

The CPSC funded an exploratory study between 1993 and 1995 to identify a technical solution that could be used to mitigate the risks of electrical fires as detailed in, *Technology for Detecting and Monitoring Conditions That Could Cause Electrical Wiring Fires*.ⁱⁱⁱ Underwriters Laboratories (UL) performed this evaluation, which found that arc fault detection and interruption appeared to be very promising to mitigate fires. This led to the development of the arc-fault circuit-interrupter (AFCI).

Other CPSC activities to reduce electrical wiring fires include: producing and distributing videotape demonstrations of affordable steps of incremental changes that could be made to reduce gross hazards, developing the CPSC Guide to Home Wiring Hazards,^{iv} and developing the CPSC Home Electrical Safety Audit Room by Room Checklist.^v

CPSC staff's present activities involve participation in the voluntary standards development process and the *NEC* code making process. The CPSC staff also participates in the Fire Protection Research Foundation's Residential Electrical Systems Aging project.

ⁱ Hall, J. R., Jr.; Bukowski, R. W.; Gomberg, A., "Analysis of Electrical Fire Investigations in Ten Cities," National Bureau of Standards, NBSIR 83-2803, December 1983. Available online: <http://fire.nist.gov/bfrlpubs/fire83/art002.html>

ⁱⁱ Smith, L., and McCoskrie, D., "Residential Electrical Distribution System Fires," U.S. Consumer Product Safety Commission, December 1987. Available online: <http://www.cpsc.gov/library/foia/foia04/os/reselecfire.pdf>

ⁱⁱⁱ "Technology for Detecting and Monitoring Conditions That Could Cause Electrical Wiring Fires," Underwriters Laboratories Inc., UL Project Number: NC233, 94ME78760, CPSC Contract Number CPSC-C-94-1112, September 1995.

^{iv} U.S. Consumer Product Safety Commission, *CPSC Guide to Home Wiring Hazards*, Washington DC, 2001. Available online: <http://www.cpsc.gov/cpscpub/pubs/518.pdf>

^v U.S. Consumer Product Safety Commission, *CPSC Home Electrical Safety Audit Room by Room Checklist*, Washington DC, 1984. Available online: <http://www.cpsc.gov/cpscpub/pubs/513.pdf>