U.S. Consumer Product Safety Commission
LOG OF MEETING

SUBJECT: Electrical Safety, as discussed at a forum sponsored by the National Fire Protection Association (NFPA)

CPSA 6 (b)(1) Cleared
10/2/02
No Mfrs/Prvtlbls or
Products Identified
___ Excepted by ___
___ Firms Notified,
Comments Processed.

DATE OF MEETING: September 25-27, 2002

LOG ENTRY SOURCE: William H. King, Jr., ES

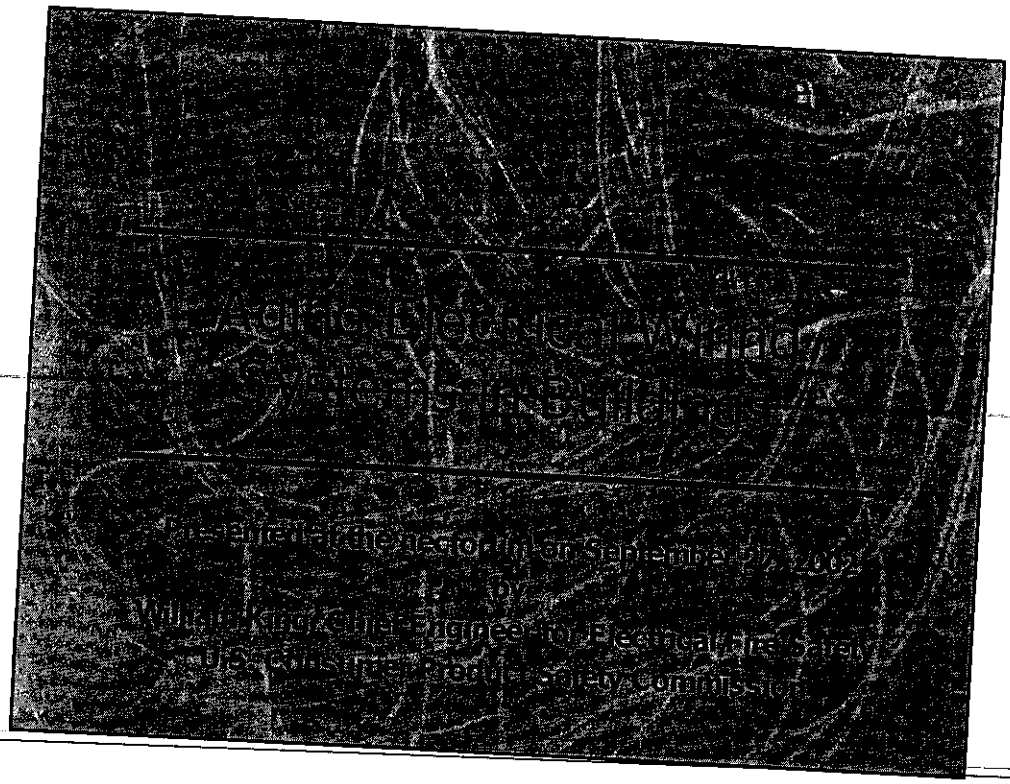
DATE OF LOG ENTRY: October 2, 2002

LOCATION: Chicago Marriott Hotel, Schaumburg, IL

CPSC ATTENDEE(S):
William H. King, Jr., ES
Linda Edwards, ESEE
Doug Lee, ESEE

NON-CPSC ATTENDEE(S):
Mark Earley, NFPA
Jeff Sargent, NFPA
and attendees at the NFPA sponsored NEC forum on electrical safety.

SUMMARY OF MEETING: Messrs. King and Lee, and Ms. Edwards, from CPSC, attended the forum. Mr. King made a presentation on the aging of wiring systems in buildings. See the attachment for the material covered.



Outline

- Data
- Inspection/Correction
- Outreach
- New Technologies
- Conclusions

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Data

Dwelling Fires Related to Electrical Wiring Systems: 40,000 fires, 350 deaths, 1,400 injuries

Older homes at greater risk; new homes not immune.

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Wire Safety Issues

- Aging, environmental stress
- Improper wiring practices
- Appliance/equipment load exceeds system design capability

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Potential Wire Safety Issues

- Environmental Stress - Chafing, embrittlement, and corrosion
- Improper installation
- Mishandling of wiring during maintenance
- Accumulated damage as wire ages

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Current Practices

- Conformance with existing regulations, codes, and standards and revisions to them.
- Training of inspectors and mechanics.
- Inspection, assessment, and maintenance of wire.
- Engineering improvements.
- Safety investigations.
- Analysis of wire system data.
- Exchange of technical information.

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Current Scientific Initiatives

- **Diagnostics:** non-destructive evaluation (NDE) techniques, inspection and detection technologies, and monitoring sensors for identifying wire system defects.
- **Failure Mechanisms:** causes and models of wire system failure and to analyze maintenance data.
- **Interconnection Technologies:** improved connectors, such as circuit breakers and in wire systems, training, management tools, and advanced distribution technologies, such as modular wiring, fiber optics, and wireless technologies.
- **New Materials:** new materials for wire system components, such as conductors and insulation including novel approaches for wire systems such as the application of microelectronic machine technology.

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Common Issues

- Faulty wiring poses a risk to public health and safety; it may lead to failure of essential functions and even to smoke and fire.
- Managing aging wire systems is expensive and time-consuming.
- Inspection, testing, and maintenance of wire systems is a technical challenge.
- Most diagnostic procedures can detect only "hard failures" that result in serious deterioration of electrical integrity.
- Our knowledge about how wire systems age and how they fail is limited.

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Common Issues

- There are limitations to our electrical codes and standards.
- Wire systems are becoming more complex with increasing computerization of operations and of information about those operations.
- Wire system maintenance is very expensive and it is difficult to get funding to address wiring issues before a system break down.
- Current practices flow from—and are limited by—the current state-of-the-art of wire systems technology in terms of design, installation, diagnosis and maintenance.

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CPSC Actions

- CPSC-sponsored electrical distribution system fire investigations in the 1980s conclude older homes at greatest risk
- CPSC priority project in early 1990s develops strategies:
  - inspection code for existing residences
  - application of new technology to older residences
  - demonstrate practical safety improvements
- CPSC joins White House National Science and Technology Council in 2000 to begin looking at aging and deterioration of wiring systems

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Inspection Code for Existing Homes

- NFPA 73
- Complements the National Electrical Code (NFPA 70)
- Principal members include CPSC, UL, IEEE, NAHB, IAEI, NECA, NEMA, EEI

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New Technology

- CPSC-sponsored research contract in 1995
- Arc-Fault Circuit-Interrupter (AFCI) technology identified
- First generation AFCI devices on the market
- New NEC requirement for AFCI in the 1999 edition

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CPSC Demonstrations

- Four homes inspected and improved (Washington, DC area, Atlanta, St. Louis and Redlands, CA)
- Produced TV-quality videos
- CPSC Guide Booklet "Home Wiring Hazards"
- Nationwide distribution of over 1000 sets of materials to state and local fire and electrical officials

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Wire System Safety Interagency Working Group

Consumer Product Safety Commission
Department of Commerce
Department of Defense
Office of the Secretary of Defense
United States Air Force
United States Navy
United States Army
Department of Energy
Department of Transportation
Federal Aviation Administration
Federal Railroad Administration
Federal Transit Administration
US Coast Guard
Food and Drug Administration
National Aeronautics and Space Administration
National Science Foundation
Nuclear Regulatory Commission

In addition, the following organizations are represented on the WSSIWG:

Defense Nuclear Facilities Safety Board
Office of Management and Budget
Office of Science and Technology Policy
National Partnership for Reinventing Government
National Transportation Safety Board (observer)

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Current CPSC Activities

- Chairing IWG subgroup for wiring in buildings
- One Strategy: Federal government addresses older wiring in government-owned housing with AFCIs
- Outreach efforts via media (publications, video tapes, presentations
- Continuing efforts via codes and standards
  - NFPA 70 proposals for additional AFCI protection
  - NFPA 73, evaluation criteria for installed systems

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Conclusion

The aging of wire systems is a national safety issue.

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Recommendations

- Three basic strategies are necessary to improve wire system safety:
  - Altering the perception of wire systems.
  - Increasing collaboration between industry, academia, and the government.
  - Improve wire system technology.

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