



QUOTABLE

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Remodeling and other expansions over time can take a toll on a home’s electrical system.



AGING HOMES: Overloaded and Out of Code

WITH 30 MILLION HOMES AT RISK, PREVENTATIVE MAINTENANCE IS MORE IMPORTANT THAN EVER

By C.J. Schexnayder

AS THE NATION’S residential infrastructure continues to age, so grows the danger of fires arising from the electrical systems. While this correlation seems logical enough, it is only recently that specifics of the hazard and the possible steps to address it have been studied in detail.

Residential fires attributed to electrical distribution systems and lighting equipment tops 24,000, resulting in hundreds of deaths and more than \$700 million in damages,

according to the National Fire Protection Association (NFPA).

Last summer the findings of the Residential Electrical System Aging Research Project undertaken by David Dini and John Drengenberg, of Underwriters Laboratories, Inc., were unveiled to the industry. The study, conducted in conjunction with the Fire Protection Research Foundation, examined a total of 30 homes from across the country that ranged between 30 and 110 years in age.

“This is an important project and one that’s never been done before,” says Drengenberg,



➤ The Facts on Fires

Common causes of electrical fires in older homes are:

- Inadequate and overburdened electrical systems.
- Thermally reinsulated walls and ceilings burying wiring.
- Defeated or compromised overcurrent protection.
- Misuse of extension cords and makeshift circuit extensions.
- Worn-out wiring devices not being replaced.
- Poorly done electrical repairs.
- Socioeconomic considerations resulting in unsafe installations.

Source: U.S. Consumer Product Safety Commission



Electrical safety is key in protecting homes from fires.

• consumer affairs manager of Underwriters Laboratories (UL). “Residential electrical systems are seldom inspected after they are installed and they tend to be destroyed in house fires.”

The study found that non-code compliant installations often were the result of several factors; lack of local laws regulating installation and renovation, installers not complying with code regulations, and unqualified homeowners undertaking their own upgrades.

In the late 1980s, the U.S. Consumer Product Safety Commission determined that the frequency of such fires in homes older than 40 years was disproportionately high. The UL study examined the use of unsafe wiring practices that often accumulate over time in existing dwellings as well as the effects of aging.

The UL study underscored the need to treat electrical infrastructure with better projection of future load needs and greater prioritization on preventative maintenance.

“Older homes remain safe as long as they met current code when installed, and that the system has not been overly expanded on and any additions and renovations have been inspected to be in code compliance,” says Michael J. Johnston, the executive director of standards and safety with NECA.

While a facility’s electrical infrastructure may be exemplary when the doors open, each day that follows sees the system fall further into obsolescence. The regular march of changes—including minor expansions, necessary remodeling, and inevitable equipment upgrades—takes a toll on an electrical system.

UL estimates that as many as 30 million homes in the United States—almost a third of the country’s housing—is more than a century old. Even if the electrical systems in these homes are in good condition, the vast change in electrical load demands creates a significant danger.

Load demand, in particular, has grown at an ever-increasing rate throughout the past half-century. The advent of air conditioning in the ’60s and ’70s dramatically increased household electrical demands, as well as other appliances and electronics, such as PCs and clothes dryers.

So far, the slump in the commercial market hasn’t translated into a boom in renovations that code revisions could address. But the scramble by inexperienced contractors

• into other areas of the shrinking market could exacerbate a different issue specifically addressed by the UL study—under-experienced contractors.

“We are seeing more mom-and-pop operations bidding on larger projects than they have in the past,” says Jeff Withers with Collins Electrical Company, Inc. in Stockton, Calif. “The problems in the economy are pushing people into other markets that they haven’t had experience in before.”

The existing National Electric Code® and the NFPA 73: *Electrical Inspection Code for Existing Dwellings* both address the fire hazards that older electrical systems may present, but the extent of the danger had not been quantified prior. A current NFPA project is investigating calculating future load demands on existing units and some of the proposed changes to the current electrical code should address the issues as well.

Government regulations through OSHA and NFPA 70E have increased the emphasis on preventive maintenance in the corporate sector. The financial impact of accidents in terms of downtime, liability, and lost production is a strong incentive as well.

The problem with enforcement of the code often arises from the disparity between where it originates and where it is enforced. The code is written at a national level but municipalities are the governmental bodies that make sure it is put into effect. Most cities look to their state regulations for guidance on this.

This creates a drag time of several years between the upgrade of the existing code and the implementation of local regulations. It also doesn’t address the problem of ensuring that renovations—past and present—are code compliant.

While the UL study focused on residential electrical systems, many of the findings also apply to commercial structures that often undergo substantial renovations during their lifetime. The need to ensure the code compliance of these buildings is often more robust due to the greater danger that changes to the electrical system may pose. ✎

➤ Hear It For Yourself

Listen to the podcast about UL engineers David Dini and John Drengenberg’s research on electrical system aging at www.necplus.org.