

Our Nation's Emergency Systems Need:

CIRCUIT INTEGRITY



When Disaster Strikes

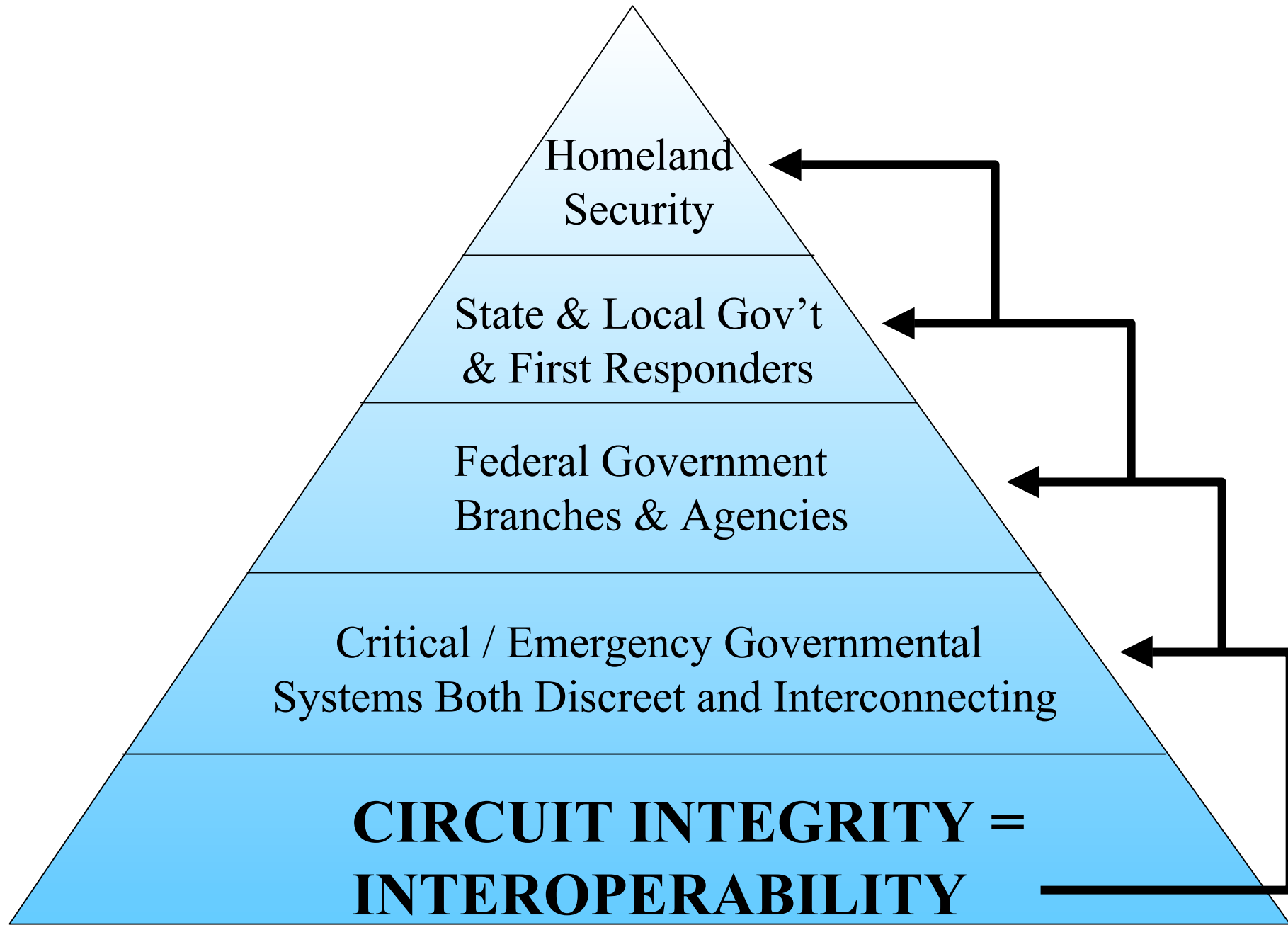
WHY IS CIRCUIT INTEGRITY NEEDED ?

Because the current wire & cable that connects our entire Federal Emergency System is operating on outdated wiring that in many cases could not pass the more stringent emergency test standards today.

While today's polymers are significantly better than their precursors in terms of limiting smoke generation, toxicity and flame propagation, they can do little by themselves to ensure circuit integrity during a disastrous event.

Furthermore, in most buildings old wire&cable is not removed and is mixed in with new wire&cable. These older cables will only add combustible fuel and toxins to the raceways and plenums they reside in.

Finally, in order for Homeland Security to be achieved, the very systems Government operates from must remain functional in times of emergency.



THE DRIVERS & BENEFACTORS OF CIRCUIT INTEGRITY

DRIVERS:

- TERRORISM
- 9/11
- HOMELAND SECURITY: Interoperability
- CONGRESS BILLS: S2661 & S2664

BENEFACTORS:

- Government employees
- First Responders
- Americans

U.S. SENATE TAKES ACTION: (Excerpt)

Senate Rpt.107-295 – FIRST RESPONDER TERRORISM PREPAREDNESS ACT OF 2002

“Uses of Assistance ...

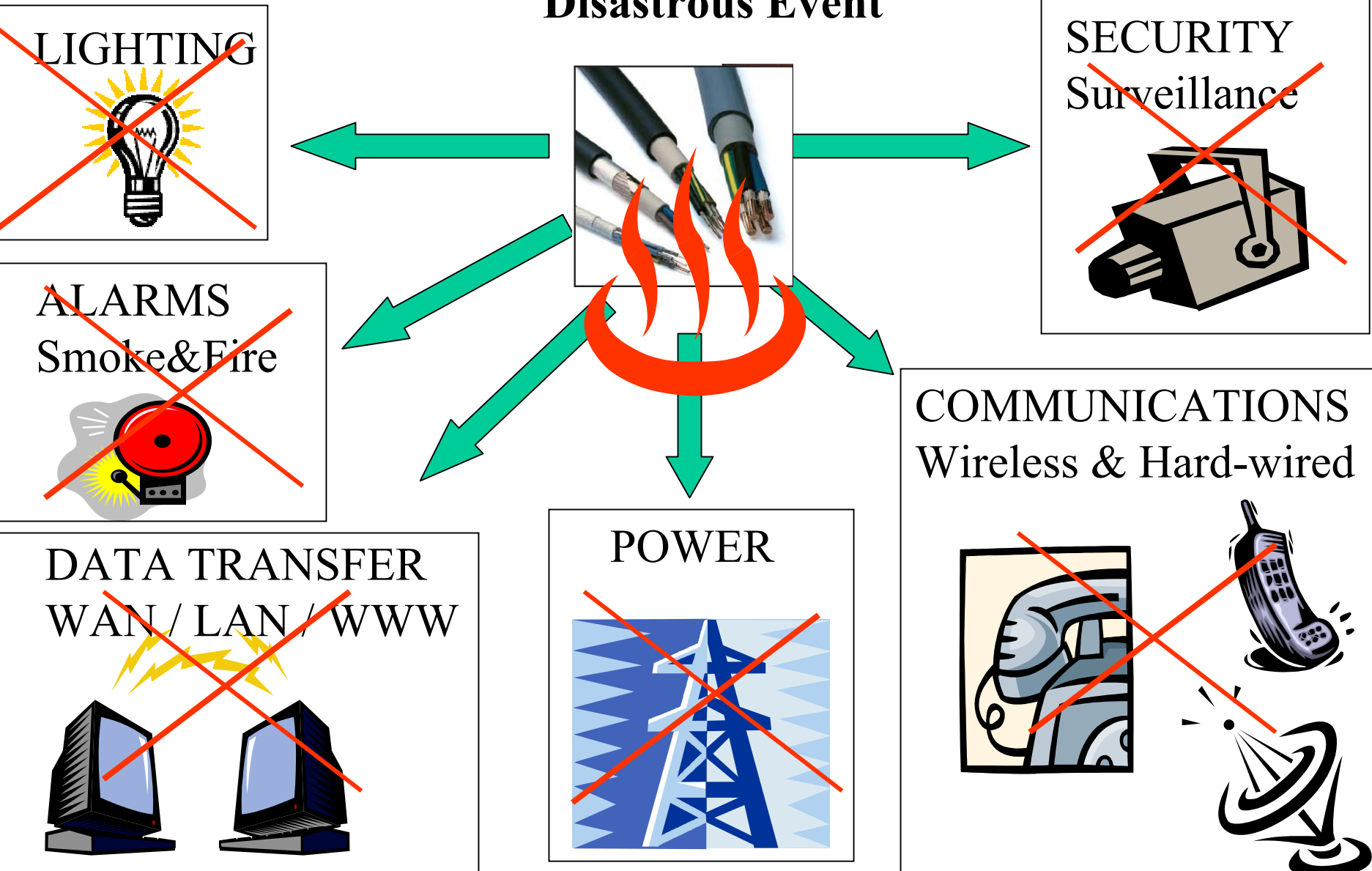
Office to develop a comprehensive strategy for achieving interoperability prior to providing funding. The committee intends that the Office proceed as expeditiously as possible in the development of this strategy and that the Office consider the most cost effective methods available to achieve this goal, such as technology that will integrate existing communications equipment. **The committee recognizes the importance of maintaining the operational integrity of emergency systems that may be subject to failure as a result of fire or water damage to essential wiring or cabling, and of utilizing necessary measures to ensure continued operation of these vital systems. “**

EMERGENCY SYSTEMS

- Alarms
- Communications
- Data Centers
- Lighting
- Power
- Security

Whether these systems are designed as Real-time, Standby or parallel, the need to require that these systems survive critical events has never been greater and its expected will become increasingly more important.

Our Current Emergency System Is In Jeopardy Because it Lacks Circuit Integrity During a Disastrous Event



Some Simple Facts

- Standard alarm, communications & data wiring will fail in under 60 seconds. Power & signal cables in under 20 minutes. (tested in conduit)
- Standard C.I. Alarm, communications & data wiring will operate for a minimum of 2 hrs. (while subjected to flame, water and mechanical impact).
- It has been proven that C.I. Wire & Cable reduces: Injuries by 75%; Fatalities by 66% & Loss of Property by 70%. (comparative statistics for high-rise / high population density structures).
- One key reason why most electrical apparatus and wire and cables fail can be based on the theorem: For every 10°C rise in temperature above ambient, you will reduce the dielectric strength of your insulation wall by 50%. Now add mechanical impact and system failure should occur.

FACTS CONT.:

- **Most of the circuit integrity development has been performed outside our country because terrorism has existed in places such as the U.K., France, Germany and Japan for a far longer period of time.**
- **The U.S. Navy first learned about circuit integrity from the U.K.'s experience in the Falklands War. Hence, the Navy then created the first circuit integrity spec: Mil-C-24640, an emergency communications application. This spec utilizes Firox[®] mica tape as the primary flame/electrical barrier.**
- **The most comprehensive circuit integrity standard is the British Standards Institute 6387. It creates a matrix of 9 separate types of emergency cable designs, depending on the critical nature of the type of cable to be used for a given function (see graph).**
- **U.L. has only one circuit integrity test standard for emergency alarm wiring to test flexible (non-M.I. Cable designs): 2196. However, it does not go to the degree in scope of BSI 6387.**

BSI 6387

(AT A GLANCE)

<u>TEMP</u>	<u>HEAT</u>	<u>HEAT + WATER</u>	<u>H+W+M. IMPACT</u>
1832 F	X	X	X
1382 F	X	X	X
1202 F	X	X	X

Heat + Water + Mechanical Impact

WHAT WILL PROVIDE CIRCUIT INTEGRITY ?

Firox[®] is a unique tape that is based on Cogemicanite micapaper. Mica is a member of the phyllosilicate family of minerals and exhibits the following characteristics:

- High Temperature Resistance up to 1200°C or 2192°F
- High Dielectric Strength > 500 VPM
- Excellent Chemical Resistance
- Non-toxic
- Non-halogen
- Non-carcinogeous
- Resists Corona Discharge at Elevated Temperatures better than any known material.

FOCUS ON NEW DESIGNS FOR WIRE & CABLE

Now that we have performed a 9/11 post-mortem on our systems' failures, there is more than enough evidence to provide proof that our existing wire & cable designs were not good enough to allow certain governmental functions to remain operable (such as communications). Obviously, it is no longer good enough just to mitigate smoke, flame, halogens and toxicity. Now the integrity of the circuit must be maintained.

The combination of Firox[®] along with new polymers such as Ceramifiable Silicone, Cross-linked Polyethylene and Cross-linked Polyolefins are now the raw materials of choice to meet the most stringent Flame, Water and Mechanical impact tests worldwide.

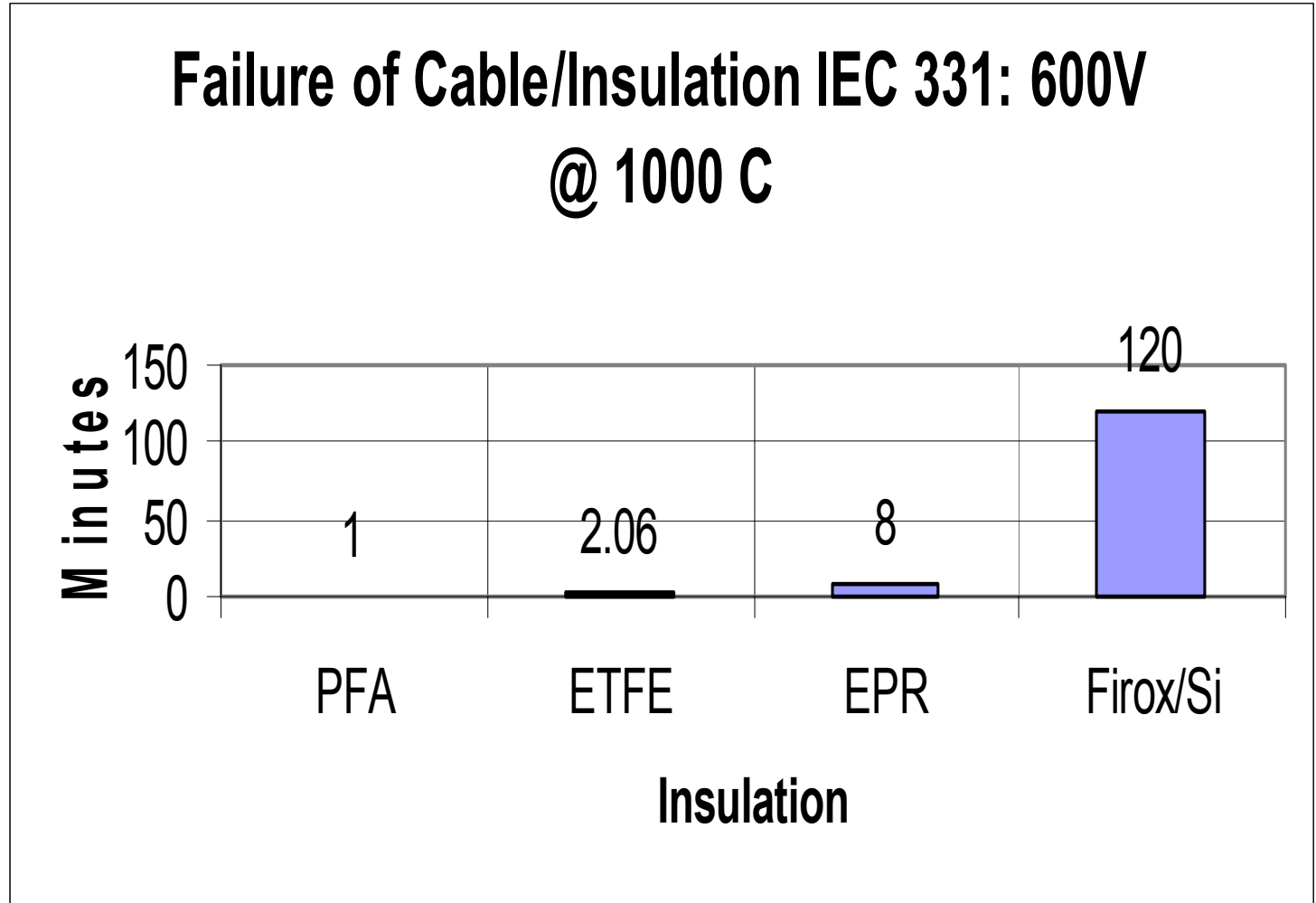


POLYMER INSULATION VS. FIROX[®] MICA TAPE

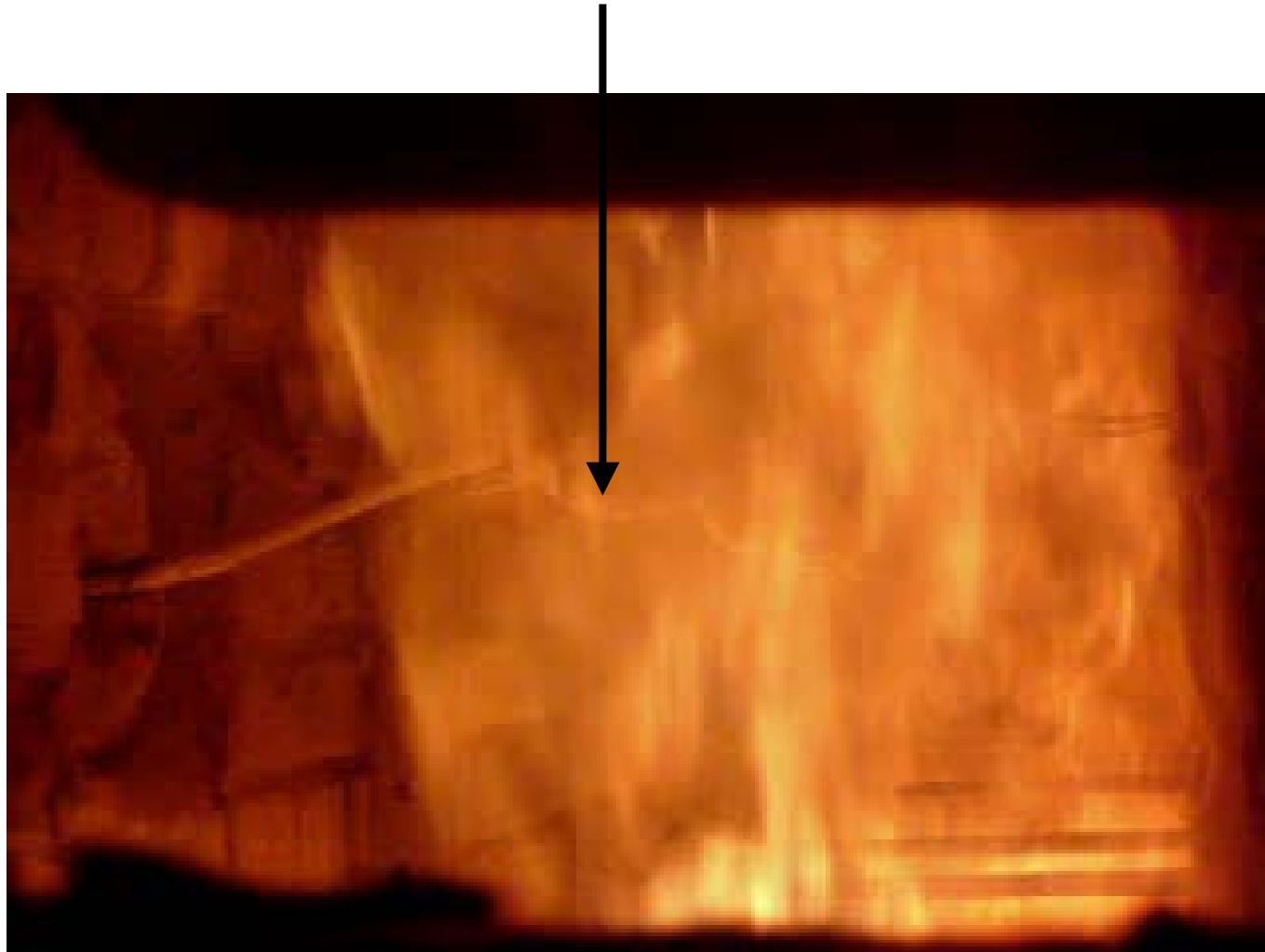
Result after test: Firox Insulated Cable Lasted 15 times longer !

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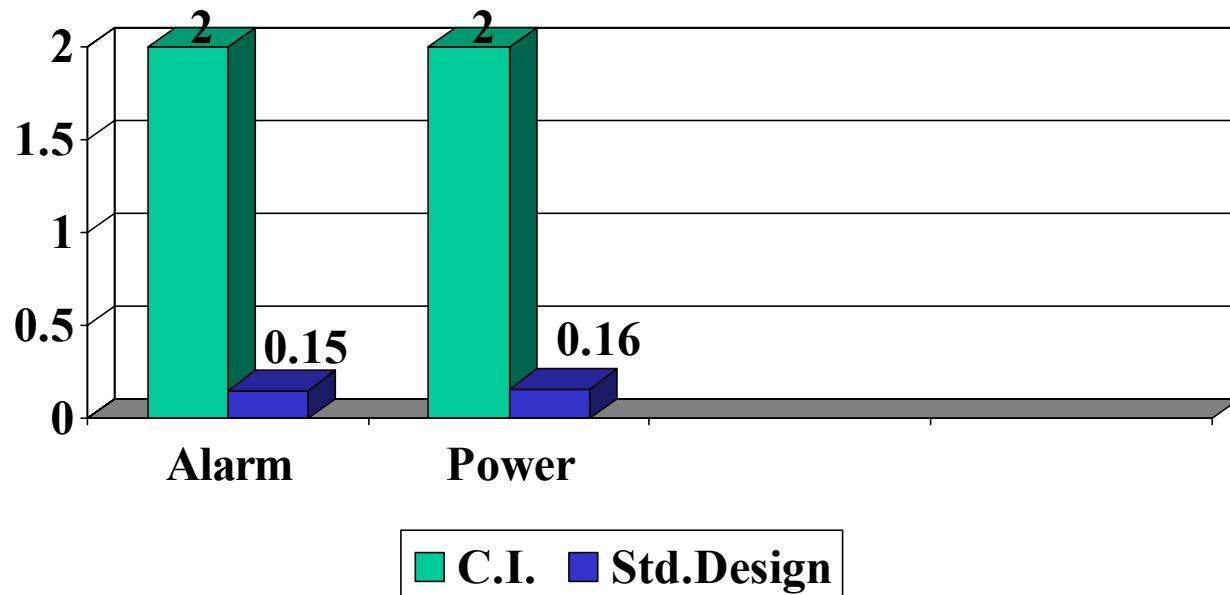
FIROX[®] INSULATED CIRCUIT INTEGRITY CABLE
SHOWN IN ACTION DURING A TWO HOUR FLAME TEST
(after the 2 hours of flame then the cable is hit with water)



U.L.2196

Circuit Integrity Cable Lasts 13 Times Longer UL 2196

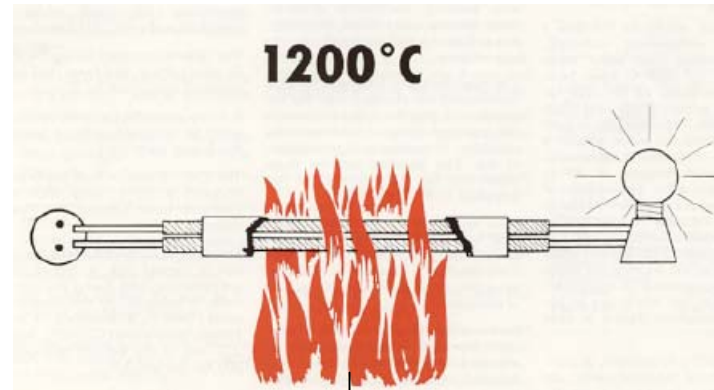
Circuit Integrity vs. Standard Designs (in Hours)



SYNOPSIS OF DERIVED BENEFITS OF C.I. CABLES

- **FUNCTIONALITY:** Wide variety of constructions able to withstand severe-duty test standards.
- **AVAILABILITY:** in copper (conductive), fiber optic (F.O.) or Multi-mode constructions.
- **EFFECTIVE:** Will allow Agency and Dept. managers to meet tight timelines for for revamping our current wire & cable infrastructure.
- **EFFICIENT:** Easy to install. Unlike M.I. Cables, these products install very quickly as any normal non-critical cable installs today.
- **HIGH VALUE:** the installed cost is usually 33% lower than M.I. Type emergency cables.

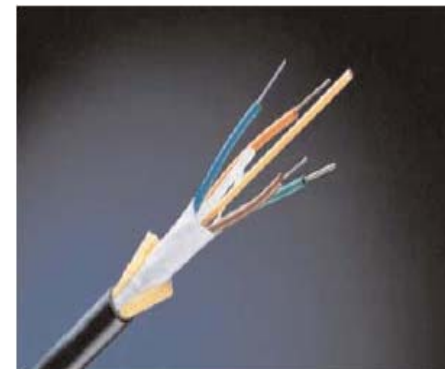
FIROX[®] = GREATER PERFORMANCE @ 1/3 Lower Installed Cost on Average Than Mineral Insulated or Metal Clad Cables



Conductive Cables



Single & Multi-mode Fiber



GENERIC TYPES OF C.I. APPLICATIONS

- **CONDUCTIVE:** Alarm, Lighting, Power, Communications (both in hard line and RF styles), Security.
- **F.O.:** Networks, Communications, Server Farms, Data Storage Safe Sites.
- **MULTI-MODE:** Real-time Video & Data feed, Remote Command and Control.

CONCLUSIONS

- **INTEROPERABILITY:** circuit integrity will aid us in achieving this goal in a substantive way by ensuring that the monies spent on the new hardware and software will in fact remain operable during a crisis.
- **TIMELINESS:** activity already being displayed by the Legislative and Administrative Branches regarding circuit integrity to be important enough so as to include effective wording in the Report Section of Senatorial bills.
- **COST – EFFECTIVE:** circuit integrity cable is available today. This negates any costly product development and provides the necessary means to begin incorporating this in your projects today. Furthermore, these new high performance cables have typically lower installed costs than current emergency designs.