



DOW CHEMICAL U.S.A.

September 6, 1978

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Mr. James D. Tanzilli
Manager, Fire Affairs
Plastic Materials Sales
The B. F. Goodrich Chemical Division
6100 Oak Tree Boulevard
Cleveland, Ohio 44131

cc: R. B. Downey, B. F. Goodrich
D. L. Kent, B. F. Goodrich
R. D. Savage, B. F. Goodrich
J. R. Lawrence, SPI, New York

Dear Jim:

Appreciate your sending me the article which appeared in Popular Mechanics. It seems to me that the SPI Board has got to address itself to these types of communication problems. It is a problem that goes way beyond PVC although our industry's product does get highlighted in a lot of these types of things. However, I believe there is a much broader problem looking at the entire plastics industry. I'd appreciate it if John Lawrence would bring this to the attention of the SPI Board. In the meantime, I think the PVC Safety Committee Communications Group should respond to this Popular Mechanics article.

Thanks for bringing it to my attention.

Regards,

D. C. Nuechterlein

as



BF Goodrich
Chemical Division

The BFGoodrich Company
Chemical Division
6100 Oak Tree Boulevard
Cleveland, Ohio 44131
216-524-0200

September 1, 1978-180

RECEIVED SEP 11 1978

Mr. John A. Linkletter, Editor
Popular Mechanics
224 West 57th St.
New York, NY 10019

Subject: "The Home Inferno-Now It's Deadlier Than Ever", September Issue

Dear Mr. Linkletter:

Mr. Fales' article provides important home fire safety recommendations. Widespread use of recently developed reliable and economical smoke detectors plus a home fire escape plan, especially, are key elements to help reduce the Nation's annual fire death loss. Public education about fire and protective steps to be taken in and about the home are vitally needed and magazines like Popular Mechanics can make effective contributions.

The article, however, contains a number of misleading implications that will probably create an erroneous impression in the reader's mind about plastics in general and polyvinyl chloride in particular.

There is no doubt that plastics, like wood, paper, and cotton, will burn. Neither is there any doubt that plastics are part of the hazard which every home presents when ignition occurs. Plastics are not, however, when properly used, the hair-trigger bomb portrayed by the article. The plastics industry, through the Society of the Plastics Industry* (SPI) and individual company efforts have worked closely with the National Fire Protection Association and the National Fire Prevention and Control Administration to develop educational material; with the National Bureau of Standards and leading universities on research programs; and directly with fire departments in fire prevention programs. All of these, to name a few, are resulting in a better understanding of the proper use and control of all materials. The plastics industry is an important source of information on fire and would have been able to make an important contribution to your article.

SPI-08783

Mr. John A. Linkletter

Page 2

September 1, 1978

The article seems to infer that wood, because it smells good when it burns, is a friendly hazard. When burned, wood will produce at least 175 different combustion gases including carbon monoxide, and acrolein; the latter being a potent respiratory irritant. There are no non-hazardous vapors of combustion, regardless of material. The main hazard from burning materials is carbon monoxide and inhalation of combustion products from natural as well as man-made materials pose serious hazards.

In many ways the use of plastics has contributed to improved fire safety. Polyvinyl chloride is an example. Polyvinyl chloride is a remarkably versatile plastic because it can be compounded to a broad range of useful properties at an economical cost. It first came into general use in the early 1930's as insulation for wire. Its resistance to ignition, low flame spread, and long term physical and electrical integrity made it safer and more usable than the rubber insulation which was the conventional material employed at that time. At the outset of World War II, the Navy insisted that shipboard wiring have polyvinyl chloride insulation to reduce flame spread. Since then it has found widespread use in many applications and has an excellent history of product performance and safety.

Contrary to the article, no chlorine, phosgene, nitrogen dioxide, sulfur dioxide or ammonia are produced from the combustion of typical polyvinyl chloride compounds. Correctly, the author indicates that hydrogen chloride is produced. Hydrogen chloride has a very disagreeable odor at a level far below that which may be considered toxic, therefore acting as an effective warning indicator. On the other hand, carbon monoxide produced by the burning of any material is odorless and tasteless.

The subject of fire is an important topic. It is far too important to generalize and blame all problems on a single material. Please be assured that SPI and we at BFGoodrich (a leading manufacturer of polyvinyl chloride) are willing to work with you in answering questions and providing assistance in the preparation of articles relating to the use of plastics.

Very truly yours,
BFGOODRICH CHEMICAL DIVISION

James D. Tanzilli

James D. Tanzilli
Manager, Fire Affairs
Plastic Materials Sales

*The Society of the Plastics Industry
355 Lexington Avenue
New York, NY 10017
(212) 573-9400
Jerry Carroll, Safety Director

JDT/lz

SPI-08784

cc: J.P. Carroll

bcc: D.L. Kent J.R. Lawrence
R.B. Downey H.D. Feehey
C.A. Clark J.S. Hearons
E.J. Collins

BF ~~Goodrich~~
Chemical Division

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August 29, 1978-171

Mr. D.C. Nuechterlein
Dow Chemical U.S.A.
2020 Dow Center
Midland, MI 48640

RECEIVED SEP 5 1978

Dear Mr. Nuechterlein:

I call your attention and that of the PVC Safety Group to the attached article, "The Home Inferno - Now It's Deadlier Than Ever" which appears in the current (September) issue of Popular Mechanics magazine. The article unfairly attacks plastics in general and PVC in particular in building toward an otherwise important message - surviving a home fire. The case against PVC appears to be mainly drawn from Dr. Victor Esch's 1976 JAMA article.

Popular Mechanics is a home handy-man oriented magazine with a circulation of 1,670,000 and countless other readers of back issues for months to come in barber shops all over the country. It is sad to see articles such as this in such a widely read consumer oriented magazine.

Very Truly yours,

BFGoodrich Chemical Division

James D. Tanzilli

James D. Tanzilli
Manager, Fire Affairs
Plastic Materials Sales

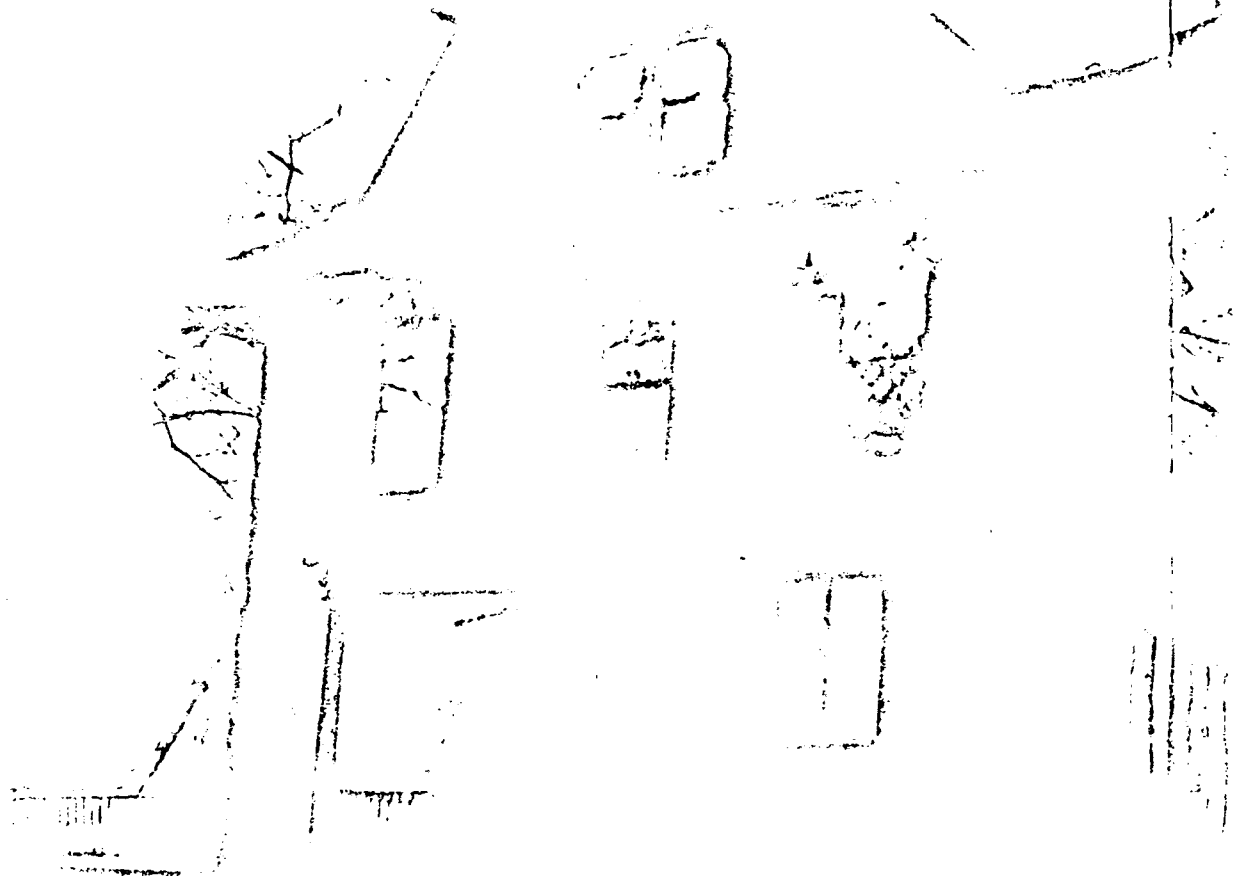
JDT/lz

Enc.

cc: E.J. Collins R.B. Downey
J.R. Lawrence R.D. Savage
J. Carroll D.L. Kent

SPI-08785

The home inferno— now it's deadlier than ever



New materials building today homes
plus phenomena like flashover and
flashover make any fire in your home
a serious threat to life

by Ed Fales

The idea of a fire breaking out in your home has never been a pleasant one. Unfortunately, the evidence mounting up now in reports from fire investigators, insurance companies and municipal officials points to an entirely new syndrome of fire in the home.

In brief, these fires, which can cause death in a number of ways, are deadlier than ever.

From these reports, the consensus describes the new fire syndrome as a new pattern of toxic or combustible

gases being generated, sometimes leading to an explosive inferno from which there can be no escape.

Day after day, newspapers are reporting: "House explodes as firemen arrive. Seven die. Puzzled firemen find family dead but no one was burned."

And so on. It happens, too, in apartments, and even one-story ranch style homes—and mobile homes, many of which now are known to be literal firetraps.

Fires weren't always like this.

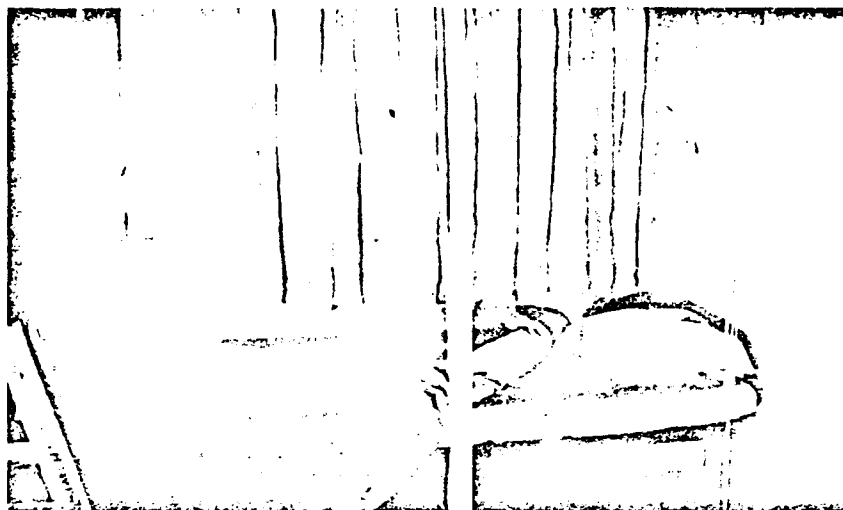
You'd smell wood smoke. (Now there may be no wood, no smell at first.) You'd hear the crackle of flames. (Now there may be silence—right up until the booming phenomenon known as "flashover.") And before, there would be time to phone firemen, or use a garden hose or fire extinguisher. (Now, says the National Fire Protection Assn., you're lucky if you have 20 seconds in which to act.)

The trouble is: We fill our homes today with plastics and flammables

SPI-08786

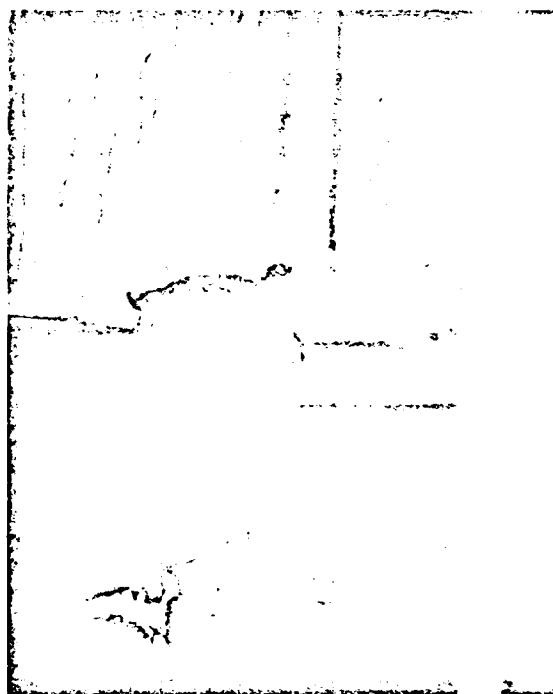
The night inferno—a deadly fire that begins noiselessly and with little or no flame before a sudden violent eruption into holocaust—can claim human lives long before its telltale signs give any alarm.

DEATH IN SEVEN MINUTES



Here's how engineers tested the effects of a lighted cigarette on a foam-rubber cushion:

- 0.5 min.: Fire's a smoky spot: Anyone could snuff it out? "But that's not how foam-rubber mattresses burn," says an expert.
- 1 min.: Flames appear up to 10 inches high.
- 2 min.: Fire area now a foot wide; first smoke and gases touch ceiling.
- 3 min.: Flames are 3 feet high.
- 4 min.: Sudden tower of flame; thick oily, blinding smoke a foot below ceiling.
- 4.5 min.: Smoke 4 feet below ceiling. You can no longer stand and breathe safely. Your last chance to escape—by crawling.
- 5 min.: Flames go up the wall, light curtain. Smoke layer reaches bed.
- 6.5 min.: Flashover! Gas and soot explode, blowing out windows and door.



and fluids, some of which are toxic, others explosive. Experts say some plastics burn in weird new ways, much hotter and faster, emitting deadly fumes that if inhaled, can alter the senses and kill by asphyxiation. "Two breaths of some of these fumes and you're in serious trouble," firemen say.

Homes can seal in fumes

To make matters worse, many homes now are almost virtually sealed—for heating and cooling ef-

ficiency. Fumes can't escape. Meanwhile we keep filling them with wonderful new devices and decorations not realizing that we're virtually priming a bomb.

Today's firemen are magnificent. They arrive in seconds, and readily risk their lives. But more often, houses and apartments are infernos even before firemen get there. And even if firemen can still get in, they can't see. "Smoke is often oily and thick," they say.

"We just have to pass our hands

over the beds and feel for people."

Officials didn't begin to piece together what was happening until one day in Washington, DC., three years ago.

At 10:30 a.m. firemen received an alarm. It came from Building 213 at the U.S. Navy Yard, where a common office copying-machine had overheated and caught fire.

It wasn't much of a fire. Firemen didn't even use masks. They doused the machine, had the fire out in a jiffy. Within 20 minutes they were

on their way back to the station.

Then began a strange series of events. Back at the firehouse, firemen began falling ill. Some described it as tightness in the chest. Others had splitting headaches, dizziness, vomiting.

Next day, an engine driver fainted. Then he came to, said he "felt fine," and dropped dead.

Shocked, two Washington physicians, Drs. Robert Dyer and Victor Esch, began a long, careful investigation. The finger pointed not at CO (carbon monoxide), the old familiar cause of fire death, but at a gas which develops whenever polyvinyl chloride (PVC), a common household plastic, burns. The gas was hydrogen chloride (HCl), a real killer.

Before long the inquiry had also turned up other poisons: chlorine, phosgene, nitrogen dioxide, sulfur dioxide, ammonia.

As a service to doctors and firemen, the *Journal of the American Medical Assn.* recently devoted eight pages to fire dangers, including a five-page report from Drs. Dyer and Esch.

"Practically every structure today contains plastics capable of producing lung-damaging gases," the physicians warned. "The firefighter faces a great, new risk. . . ."

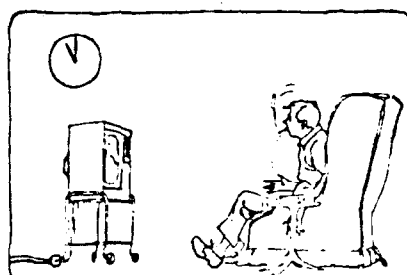
Dangerous slow burn

But what AMA didn't say was that the same risk now faces anyone whose house catches fire. Even "fire-retardant" furnishings like some drapes and rugs contribute new danger, for the very fact that they burn slowly, it's now being discovered, can lead to the emission of more gases.

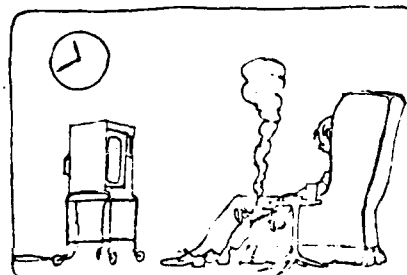
One trouble, the medical investigation found, is that some plastics have a combustion temperature two to five times higher than other household combustibles. And even the wiring (including telephone wiring) in your house can give off poisonous gas, for it may be coated with PVC insulation.

Here's what might happen if a fire starts in your main switch box: The plastic insulation emits white, mist-like HCl fumes that resemble steam. One or two breaths can derange you to the point where it is impossible for you to think your way out.

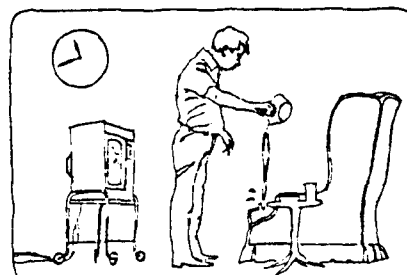
Newspapers every day report deaths from "smoke inhalation." The real cause is often fire gases. In California recently, a confused woman could have escaped her one-story house merely by opening an outside bedroom door and stepping out to her lawn. Instead she opened



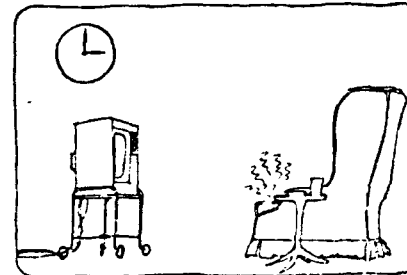
11:00 p.m.: Man watching TV show dozes off; his cigaret falls onto the plastic-base upholstery of his lounge chair.



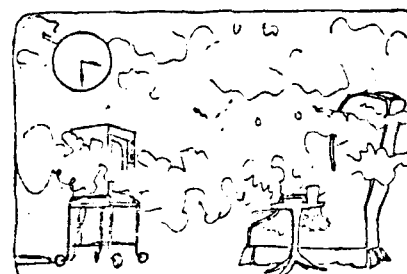
11:40: Material has been smoldering very gradually; only now does it begin to emit visible amounts of thin smoke.



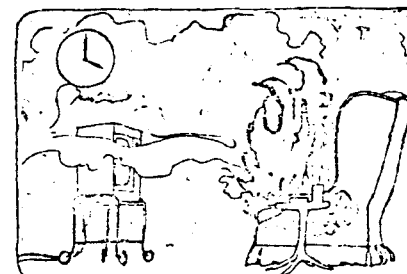
11:41: Man starts awake, gets water in a pan from the kitchen to douse the smoldering spot. Smoke gone, he goes to bed.



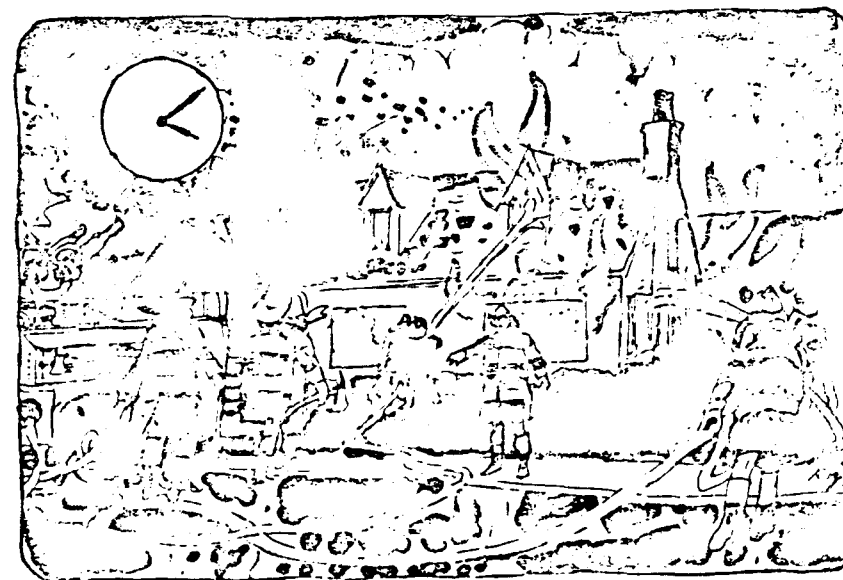
3:00 a.m.: Fire in plastic material, never really put out, burns slowly as a "cold fire" for hours, emitting gases.



3:30: Lots of gas and smoke now; toxic fumes have already affected sleepers' mental processes—perhaps even fatally.



4:00: As gases continue to fill the house, the first real flames now appear—five hours after the cigaret was dropped.



4:10: Firemen summoned by neighbors arrive just as flashover occurs and the fire explodes from the TV room into the rest of the house. Sorrowful friends and relatives are amazed that the family was not aroused soon enough to save it.

the wrong door, and ran into a flaming hall.

The danger can continue even after fires are out because of "heat sink." Hot concrete, for instance, can pour forth toxic HCl for about an hour.

Another danger, the AMA reported, is slowness to awaken. Most of us think we can jump right out of bed and escape. Instead, the AMA cited tests showing it can take a sleeper as much as 12 to 15 minutes to wake up and act.

Firemen say one primary pattern is the "bed-smoker's fire" (see photos on page 97). Another, nearly as common, is the "TV-chair" fire.

Here's how the latter happens, as in the illustrations at right:

The time, let's say, is 10:50 p.m. You're watching TV with friends. It's been a jovial evening. One friend puts down a glass, lights a cigaret.

But the TV show proves dull—and he dozes off.

Time, 11:02 p.m.: Someone says, "I see smoke!" A thin thread of blue from the sleeper's chair. "Hey, man, you're on fire!" But it's only his cigaret in the foam rubber cushion.

The cushion is smoldering. You get some water and douse it. Laughter. Friend apologizes. (You say, "Oh, it's just an old chair.")

At midnight, friends leave. You go to bed.

3:40 a.m. Alone in the dark, the plastic chair is still invisibly smoldering. It's what's called a "cold fire." (Chairs have actually been known to turn entirely to ash without flame.)

4:47 a.m. Sudden hammering on your door. A neighbor leaving for an early job has seen a flicker of flame. He shouts, runs to call firemen.

4:52 a.m. It suddenly dawns on you that you've heard noises and smell something strange. It seems to take forever to wake up. Then the awful fact finally penetrates: Your house is on fire.

You run to collect your family. But the door's not where it should be. You bang your face against a wall. You don't realize you've inhaled toxic fumes and aren't thinking right. But let's say somehow, at last, you collect your family and go out a window.

4:58 a.m. Just as firemen arrive, your TV room literally blows up. You've had a flashover, in which superheated gases and soot have exploded. Your house is gone, but you were lucky.

Lesson from Texas

One of the nation's best protected

10 RULES FOR SURVIVING A HOME INFERNO

It was the writer's privilege, some years ago, to develop the "Family Fire Drill" program, now widely advocated by fire departments and insurance companies, with the help of the National Fire Protection Assn. Now, with new help from NFPA, the National Safety Council and the National Fire Prevention and Control Administration (a new government agency), I recommend this new inferno-escape procedure:

1. Sleep with bedroom doors closed to keep out fire gases.

2. Install at least one smoke detector right now. They no longer cost a fortune. One major supplier is offering them at under \$17 retail. Get a reliable brand.

3. Put it in the right place—never a "dead air" space. A preferred place is in the hall entrance to your sleeping area or at the top of a stairwell outside your bedrooms.

4. Make an up-to-date home fire escape plan, remembering about those gases. Train everyone. How will you all get out if separated by a flaming hall? After you're out, where will you meet—so you know everyone's out?

5. If yours is a two-story house, install (neatly boxed) rope or metal fire ladders in bedrooms. If separated by a hall from a child or someone infirm, give him a bedroom with a porch or carport roof which can be reached from a window. Consider purchasing one of the new escape devices (see text on this page).

6. If you buy a new house, be sure

it has detectors. If you build a house, be sure your architect designs every bedroom with an escape route.

7. Have an absolute rule: No one in your house ever again smokes in bed (already a criminal offense in some states). And be sure no one makes it a habit to smoke, drink and fall asleep while watching TV. Next to the bed-smoker, this person is one of the greatest threats to a household.

8. Add smoke detectors as soon as possible in strategic places where rising smoke would go, such as hallway ceilings, over TV sets, up stairways. And remember that children sometimes start fires in their rooms, so have detectors there, too.

9. Install inexpensive "remote" horns (about \$12 and up) so a detector alarm in one room will be broadcast in all bedrooms. Some now broadcast up to 200 feet by radio, even farther over electric light wiring. We tested one such unit in our TV room. It set off two bedroom alarms upstairs—plus two in a neighbor's house 300 feet away!

10. Best of all, add one of the new automatic home-sprinkler systems now being developed. Compact new systems can be installed in the ceiling without spoiling your room decor. Firemen say you can now virtually fireproof any home with them. Cost: in a new or remodeled home, as low as \$50 a room; can also be installed in older homes, with obvious additional work. But they can help pay for themselves in lower insurance costs.

communities is Farmers Branch, Tex. (pop. 30,000), a Dallas suburb. May 3, 1975, worried by growing fire danger, Farmers Branch city fathers ordered an electronic smoke detector (ESD) program into effect. Whenever anyone moved into a house, a detector was to be installed.

There were a few protests. But these died out on the very first day of the program when fire gases killed a woman. Since then, Fire Marshal Jack Dyer estimates, ESDs have saved 10 lives. And as this is written, they have helped 13 others escape.

There's no doubt that smoke detectors, which can sense fire long before you do (see *Fire Alarm: New Home Appliance That May Save Your Life*, page 74, Dec. '76), save lives. Some states now require them in all new dwellings and apartments. And one small Pennsylvania city now actually buys them at wholesale for its citizens. In some communities there's talk of selling them for \$3 a month—added to residents' water bills.

Other safeguards may come, soon. One is home fire masks. Against the new dangers, firemen in some cities now are ordered to wear masks in

all fires. "In Farmers Branch," says Jack Dyer, "you'll see our men putting masks on while riding our trucks."

Masks and reserve air tanks now cost \$640 and up. But it's only a matter of time before home masks are available at lower cost.

New escape systems

"There is really no reason you should have to crawl out of a window and jump, or fall or try to fumble your way to a rope ladder," one researcher says. "From now on, our building codes should require all new homes and apartments to have ladders, or escape chutes like those in airliners. Or small window-balconies reachable through doors, with drop-down ladders or poles.

Already, several new products are making escape easier. One, is Reinhard Corp.'s "life ladder." Installed near a window, it looks like a downspout—but has rungs that flip out to make it a sturdy aluminum ladder. This can be used for up to 25-foot (three-story) heights. Another is the Booth balcony, with drop-down steps, which can be installed outside any window. Others include the

(Please turn to page 208)

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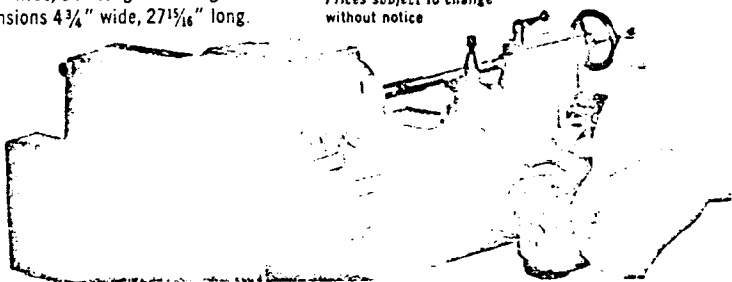
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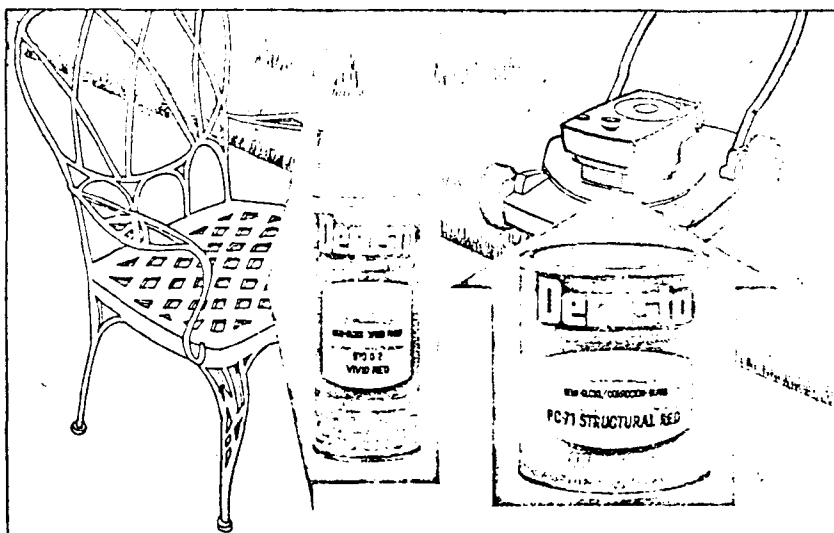
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THE HOME INFERNO

(Continued from page 99)

Resmatic controlled-descent harness developed by Dr. J. Nigel Ellis of Wilmington, Del., in which a wire reel lowers you at a constant 3-ft.-per-second maximum rate.

Smoke detectors vital

But your immediate objective, if you don't yet have them, is one or more smoke detectors. There are two types—ionization and photoelectric; some are wired into house circuits, others plug in or are powered by batteries.

Plug-in or battery ESDs are simple to hang from brackets near ceilings. Experts generally prefer permanent wiring connections, and some communities now permit you to make your own hookup if *you know how*. "If you can convince us, we give you a permit, and after the job's done we send an inspector to see it," says Farmers Branch Marshal Dyer.

What about heat detectors and fire extinguishers?

Heat detectors (HDs) are considered very reliable, and automatic heat-activated extinguishers over your furnace, workbench and car, experts say, provide great protection.

But HDs have not been designed to give you a quick alarm if *fire breaks out somewhere else in the house*. Thus, ESDs are being built into HD units: You get HD reliability plus ESD ability to sense smoke drifting in from other rooms.

Fire extinguishers are handy, and can deal adequately with many small daytime fires. "But if fire ever wakes you up at night," warns one expert, "don't waste time with an extinguisher. Get everybody out!"

If you are an apartment dweller, "Pull the little red alarm box and get the hell out," says another expert. "Time spent with an extinguisher is better spent waking people up!"

Experts say some modern condominiums and town houses are no safer than most single-family homes. In one town house fire recently, fire started in the usual first-floor garage. There was only one escape stairway for 100 units.

Luckily, it was a daytime fire and all got out. But its management has since ordered 40 "downspout type" escape ladders!

No matter what the initial cost, precautionary devices that wind up saving the lives you and your family in the event of the new-type home inferno must be judged one of the best investments you can ever make.

PM

SPI-08790

M.H. Johnson/T.R. Torkelson

J.D. Tanzilli

8/29/78-170

RECEIVED SEP 5 1978

Popular Mechanics Anti-Plastics/PVC Article

The attached article "The Home Inferno-Now It's Deadlier Than Ever" (Pop. Mech., Sept., 1978) draws its anti-PVC information, it appears, mainly from Dr. Victor Esch's 1976 JAMA article "Polyvinyl Chloride Toxicity in Fires." It is sad to see this type of article appear in such a widely read (circ. 1,670,000) consumer-oriented magazine. I see it is another indication of the growing need for a professional article on similarities/differences in the nature of smoke from plastics and other materials and the medical management of victims.

As the RN experience demonstrates that magazines are not particularly receptive to printing corrective responses, it is becoming clear that well done articles in the literature are needed to counterbalance the RN and PM type of works.

I believe it would be appropriate to establish a self-imposed deadline to achieve the type of professional article we have discussed. May, 1979, would represent a year after the SPI response was given to RN and may be a reasonable goal.

J.
J.D. Tanzilli

JDT/lz

Enc.

cc: J.A. Lawrence
E.J. Collins

SPI-08791