

# TRENDS IN LONG-TERM CARE

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HEARINGS  
BEFORE THE  
SUBCOMMITTEE ON LONG-TERM CARE  
OF THE  
SPECIAL COMMITTEE ON AGING  
UNITED STATES SENATE  
NINETY-FIRST CONGRESS  
SECOND SESSION

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PART 5—WASHINGTON, D.C.

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FEBRUARY 10, 1970



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**TRENDS IN LONG-TERM CARE**  
**(Harmar House Nursing Home, Marietta, Ohio)**

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**TUESDAY, FEBRUARY 10, 1970**

U.S. SENATE,  
SUBCOMMITTEE ON LONG-TERM CARE OF THE  
SPECIAL COMMITTEE ON AGING,  
*Washington, D.C.*

The subcommittee met at 9:30 a.m., pursuant to recess, in room 3310, Senate Office Building, Senator Frank E. Moss (chairman of the subcommittee) presiding.

Present: Senator Moss.

Committee staff member present: Val Halamandaris, professional staff member; and Pat Slinkard, chief clerk.

**OPENING STATEMENT BY SENATOR FRANK E. MOSS**

Senator Moss. The hearing will come to order.

We are under pressure of time this morning and we are going to have to move right along. To meet other commitments I have, and those of other Senators who will be here in a few minutes, will necessitate that the hearing be moved as expeditiously as possible.

We had some very interesting and informative testimony yesterday and I expect today will be equally productive.

I will not make a long statement in the interest of time, but I do have a few recommendations that grew out of the hearing yesterday.

I have suggested that the life safety code of the Fire Protection Association should be made a condition of participation under Medicare. I would hope the witnesses could address themselves to that suggestion today.

Second, we here are considering an amendment to remove disclaimer language which limits Medicare's fire regulations to mere guidelines which can be waived with discretion in light of community needs. I pointed that out yesterday.

We are considering a bill to ban smoking except for specified areas in hospitals and nursing homes where patients are bedridden and not ambulatory.

We are also considering a requirement for automatic closing doors and sprinkler systems under all Federal programs where funds are made available for nursing homes or similar facilities.

We are asking the Department of Commerce to withdraw their grossly inadequate pill test and replace it with something such as the (ASTM-E84) American Society of Testing Materials tunnel test.

The fire chief of Marietta, Ohio, yesterday during the hearing, presented us with a carpet here which was ignited in the room for all to see. It was interesting that he went in the anteroom behind us here and took a little strip of the carpet backing and it burns too, very readily.

We are going to begin in this morning with two very interesting witnesses who will come to the table together, Mr. Theodore O. Cron, who is president of the American Patients Association, who has been before this committee before, and we are glad to welcome him back; and Mr. James P. Regan, the fire safety consultant for the American Nursing Home Association.

Would those gentlemen come forward and be seated here?

We will hear from Mr. Cron first and then Mr. Regan.

Glad to have you, Mr. Cron. You may proceed.

**STATEMENTS OF THEODORE O. CRON, PRESIDENT, AMERICAN PATIENTS ASSOCIATION; AND JAMES P. REGAN, FIRE SAFETY CONSULTANT, AMERICAN NURSING HOME ASSOCIATION**

Mr. CRON. Thank you, Mr. Chairman.

My name is Theodore Cron and I am president of the American Patients Association.

We are a nonprofit, national organization that speaks for the consumer in matters of health policy and health care.

We are pleased to appear before you today, Mr. Chairman, because we know of your very real concern for patient well-being in all health programs.

The tragic fire being investigated by your committee today must not be viewed as an experience peculiar to Ohio. It was only an accident of history that 32 weak, aged, and enfeebled citizens of Marietta perished in the Harmar House fire.

The truth of the matter is that such a tragedy may occur at any time anywhere in the United States where nursing homes are allowed to operate under present permissive laws and regulations.

We are here today not to point the finger at Ohio—although the officials of that State have performed poorly in this matter—but to bring to your attention the national significance of what has happened.

Harmar House was called "one of the finest and safest homes in the United States" by W. H. Veigel of the Ohio State Department of Health. The Governor and the State fire marshal said the building was substantial and in compliance with regulations.

Mr. Chairman, none of these officials was incorrect, according to the standards set out by the Federal Government. And if they can speak in such terms and be right—yet witness the loss of 32 lives—then what is the situation in other States? The situation, sir, is the same and the lives of thousands of elderly patients are in jeopardy, now, today.

Following the first reports of the Harmar House fire a month ago, our association studied the matter from the perspective of Washington, D.C. Our conclusion is simply this: While the building was strong enough to withstand fire, the codes and regulations that protect patients are shoddy and grossly inferior. They do not pass our inspection as patient advocates.

The life-safety codes and regulations were inferior on January 9 and they have yet to be strengthened—despite the loss of life. And we strongly protest this official indifference to the needs of nursing home patients who cannot protect themselves. This indifference lies within the administration of the Medicare program.

The deaths caused by the Harmar House fire were primarily the result of smoke inhalation, smoke that came from a rubber-backed carpet. Medicare standards, so-called, permit such carpets in patients' rooms. Medicare did this by having no life-safety regulations of its own on carpeting.

Medicare relies on State regulations which, as we have seen in the case of Ohio, are not adequate to protect patients and save lives. The carpet in Harmar House passed Ohio inspection, lived up to Ohio standards, but contributed materially to the cause of Ohio deaths.

Mr. Chairman, the Government employees who drafted Medicare regulations that apply to extended care facilities were in the U.S. Public Health Service. The Public Health Service was, and still is quite knowledgeable about carpeting and flammability. The Public Health Service has standards for carpeting in hospitals built under Hill-Burton. And the Hill-Burton standards forbid the type of carpet used at Harmar House.

Are patients in nursing homes not funded by Hill-Burton to receive less protection and less concern than patients in Hill-Burton facilities? We hope not.

Immediately following the fire, the Public Health Service warned State officials that "certain types of carpeting and carpet assemblies used in health facilities have a high flame spread rating \* \* \*"

This advice—given only as advice—has yet to be translated into ironclad Medicare and Medicaid regulations. Why must there be delay? The Secretary of Health, Education, and Welfare has had the power to incorporate the Life-Safety Code into Medicare.

Thanks to your 1967 amendments to the law, Chairman Moss, Medicaid now does incorporate that code. It is specific. It is expertly written. But a regulation for Medicare and Medicaid directed specifically to interior finishes is needed promptly in order for the intent of the Congress, when your amendments were enacted, to be fully in force.

I might add, Mr. Chairman, that past and present Secretaries are at fault here in Health, Education, and Welfare and other Departments, as well. Loopholes exist in the programs run by the Federal Housing Administration of the Department of Housing and Urban Development and the Small Business Administration of the Department of Commerce—the Small Business Administration funded Harmar House, we understand—agencies which help finance the construction of nursing homes.

Today, however, we must concentrate on the Public Health Service, which drafted the fire-protection clauses of the Medicare "Conditions of Participation," and the Social Security Administration, which has overall operational responsibility for Medicare.

Social security carries out the conditions through contracts with State health agencies. Those agencies furnish surveyors to see that the conditions are met. Harmar House, incidentally, was inspected by

nurses of the Washington County Department of Health. The county coroner, Dr. K. E. Owens, was one of the co-owners of Harmar House, along with other local physicians and businessmen.

The Medicare "conditions" concerning firesafety can hardly be called standards, they are so nonspecific. For example, corridors in medicare-supported homes, the kind that Harmar House was, need only be "wide enough for easy evacuation."

Yet, the Hill-Burton standard and the National Fire Protection Association's Life-Safety Code have real specifications: They set—without qualification—8 feet as the minimum corridor width. Medicare's phrase "wide enough" provides escape for the operators of nursing homes, not for their patients.

Yet, as if such vagueness in the "conditions" were not enough, the firesafety section, itself, opens with a disclaimer that reveals just how permissive the law will be: "The following standards are guidelines to help State agencies \* \* \* They are to be applied to existing construction with discretion and in light of community need for service."

Mr. Chairman, the "standards" are defined right there as merely "guidelines." There are no objective specifications. The looseness applies to the 1,374 extended care facilities that were supposedly in full compliance with the conditions as of July 1969 and to the 3,402 that were supposedly in "substantial compliance."

According to the report, just released by the staff of the Senate Finance Committee, there has been "wholesale certification of facilities" under nonspecific standards. For those homes—for the patients in those homes—and for the taxpayer, the cost has been high in terms of quality of care (nonspecific and nonobjective) and in terms of dollars (money spent for protection not gained).

Our conclusion, Mr. Chairman, is that life-threatening conditions in nursing home care can exist because there is an absence of lifesaving standards.

A health program that endangers patients is a cruel hoax. No one—in or out of Government—wants to be part of such a program. Yet, that is what has developed because standards have been termed as guidelines, specifics have been ignored, and permissiveness has replaced legitimate concern.

Mr. Chairman, the firesafety conditions under the Medicare law are not unique. The same looseness and potential for tragedy exists in the matter of patient restraints. Some patients in Harmar House were tied to their beds. Nothing in the Medicare regulations speaks to the use of such restraints. This is not a technicality for patients and their families. Ohio has a requirement that restraints be used only with a signed physician's order. But those records, if indeed they ever did exist, were supposedly burned in the fire—a fire that did little structural damage, by the way.

Are there copies of such orders? Do the families of the aged victims have copies? Indeed, does the Federal Government have it in files records of such orders?

We firmly believe that a specific standard be set which requires a physician's order for restraints to be on file, that the file be open to Federal audit, that there be a time limitation for the order to

effective, and that a copy of the order be transmitted to a patient's family, if possible.

In addition, the Social Security Administration could be as specific as to require that the restraints be removed once an hour and the points of contact massaged. I believe the State of Maine and other States have this standard. Such a regulation incorporated into Medicare and Medicaid would be a matter of human dignity and civil rights.

We hope this committee will break the silence of Government and industry, a silence which conspires to reduce the Medicare program to a shambles of danger to the very people it pretends to serve. The convenience and comfort of operators of nursing homes is not the first priority. The ease of administration by Government is not the first priority. The protection and well-being of patients must remain as the first priority and it must be expressed in vigorous, specific regulations and standards of performance. And it must be done now.

Mr. Chairman, we ask that this committee inquire as to the possibility that Health, Education, and Welfare will in fact exercise its legal responsibilities and write strong, new regulations.

We also ask that the concept of "substantial compliance" be discarded and specific terms be written into the law.

We ask that these things be done for every American who is a patient in a nursing home. The Ohio tragedy can be repeated anywhere. It is the duty of the National Government to provide a national base of protection for the lives of every citizen, especially for those who are aged and feeble and, to our shame, who are trusting, as well.

Mr. Chairman, I recognize the pressures of time and will close at this point.

If the committee should desire any further comment or assistance from the American Patients Association on this grave matter, we would be privileged to respond.

Thank you.

Senator Moss. Thank you very much, Mr. Cron, for a very fine statement.

You point out the anomaly that there are standards under Medicaid but not Medicare, and that does not seem to be logical or defensible in any way at all.

I agree with your urging that this committee use whatever powers it has to make sure that we get some standards established that are specific.

You pointed out that there is a category of "substantial compliance" and then you couple it with the fact these are guidelines, anyway. It seems to me you have two diluting factors that leave you with hardly any measurable standard at all.

Certainly, a person could claim substantial compliance with a guideline as to what he ought to do and I am at a loss as to why the Social Security Administration, and the Public Health Service has allowed us to drift this long without getting some specific standards established.

The National Fire Protection Association's Life-Safety Code does have specific standards with regard to corridors you mentioned.

What other specific standards do they have?



Mr. CRON. As I understand, they do have standards on the rate and the frequency of fire escape tests for patients and other individuals in such facilities, on sprinkler systems, and on the use of materials. They are not, I believe, as specific in finishes as they could be in Federal regulations but they do have a range of standards which are now applicable under Medicaid, technically, as of January 1, but still not incorporated into all State plans.

Mr. Chairman, one point on that. I think we ought not to be dragged into a discussion of what is already on the books and what should be on the books.

We are particularly disturbed that the individuals who are responsible for the program apparently have not exercised the will or indicated they have the will to enforce strong regulations which they, themselves, are able to draft.

If it is possible for an organization such as ours to appear before you in a forum such as this on a voluntary basis and make a presentation in the interests of patients, not for ourselves, it would seem to me that the staffs of the different agencies within Health, Education, and Welfare and other agencies of Government could do the very same thing for their responsible heads of agencies.

I see no reason why the Public Health Service could not appear before their own seniors as I appear before you and make this kind of argument and presentation. I am sure Secretary Finch would respond as we hope. He would find a way.

Senator Moss. I appreciate your calling attention to this problem of bed restraints, not only because of this incident but because danger exists wherever we have bed restraints used. Apparently or at least so far as we are able to discern, there has been no observance of the requirement that there be a written authorization from the physician, before a patient can, according to Ohio, be restrained in his bed.

Mr. CRON. These individuals are, after all, patients; they are not captives. I think there is a very real distinction there. That distinction goes to the heart of the need for such regulations and methods of accountability.

Senator Moss. Well, thank you very much, Mr. Cron.

We will move on and hear Mr. James Regan, Fire Consultant to the American Nursing Home Association.

If further questions occur, why, we may want to ask them, so, if you will, remain on call, here in the room.

#### STATEMENT OF JAMES REGAN

Mr. REGAN. Mr. Chairman, ladies and gentlemen: In addition to being the consultant for the American Nursing Home Association, I am the former Chief of the Division of Fire Prevention of the City of New York. I was on the staff of the Fire College in New York.

I lectured at Columbia University, New York, and at the City University in New York. I am a member of the National Fire Protection Association's Life Safety Code Committee, N.F.P.A.-101.

I am the consultant for the New York State Nursing Association, for the greater New York Hospital Association.

With your indulgence, Mr. Chairman, I will read a statement and then I would like the opportunity to comment upon some of the evidence that was offered yesterday.

Senator MOSS. You may do so.

Mr. REGAN. Thank you, sir.

The fire at the Harmar House Nursing Home in Marietta, Ohio resulted in a severe loss of life because of the following factors:

1. Failure of personnel to close door to Room 104.
2. Delayed alarm to the Fire Department.
3. Alarms not connected to Fire Department.
4. Combustible carpeting throughout facility.
5. Long undivided corridors.
6. Long undivided cock-loft.
7. Extensive use of synthetic materials.

These conditions are still present in many health facilities throughout the country. The ANHA and its member State Associations recognize these dangers and their obligations to the community. Consequently, the ANHA-approved corrective measures calculated to prevent such tragedies.

The ANHA through its representative on the Life Safety Code Committee of the National Fire Protection Association (N.F.P.A.-10.) voted for the following amendments.

1. A written fire safety plan including:
  - (A) Use of alarms.
  - (B) Transmission of alarms.
  - (C) Response to alarms.
  - (D) Isolation of fire.
  - (E) Evacuation of area.
  - (F) Preparing building for evacuation.
  - (G) Fire extinguishment.

A fire safety plan encompassing these items would have required personnel to close the door to the fire room as soon as that room was vacated.

2. (A) Supervision of alarm systems either through direct connection to the Fire Department or the use of a central signal service.

(B) Interconnection of all required fire extinguishing or fire detection systems with the facilities alarm system to automatically transmit alarms to fire department.

3. Limiting floor coverings (rugs, carpets, mats, et cetera) to materials having low flame spread rate.

4. Subdivision of corridors with smoke barrier doors each 150 feet of running corridor.

5. Subdivision of open areas in facilities, including cock-lofts.

Had the Harmar House Nursing Home conformed to all of these amendments, the tragic fire would not have taken place.

In addition to approving these amendments, the ANHA has recommended or requested a more accurate reporting of fire deaths. The terms "suffocation" or "smoke inhalation" are simply not adequate; they are too broad and do nothing to identify the gases that may be present during a fire, or the materials that are capable of producing a toxic or lethal gas upon destruction by heat.

If I may now comment on some of the remarks made yesterday.

Yesterday, one of the witnesses said that we operate through hindsight rather than foresight. I submit, Mr. Chairman, that approving these regulations, adopting these regulations, is not operating through hindsight. These had been submitted to the full Life Saving Code Committee in October of 1969.

The recommendation that there be door closers on each room of a building can constitute a hazard for the patients in that building. The travel of smoke and gas in a building is not always through windows or stair wells; it can be through the interior facilities of the building.

You can have smoke leakage through your electric facilities, your water piping and so forth and so on.

It is not unusual for people in fire service to find a communication of fire three or more floors away, and if these people are behind doors where they are unsupervised we don't know what happens to them and we are afraid it may result in a tragedy.

There was a statement made yesterday that had there been a sprinkler system in the Harmar House the sprinkler system probably would have confined that fire. The same testimony said that the heat detection system operated at 136 degrees Fahrenheit. Sprinkler systems operate at 165 degrees Fahrenheit, the normal sprinkler head. So, if the building were protected merely with sprinkler protection, the alarm would not have been related to personnel as quickly as it had been relayed.

This definitely was a fire resistive building. By its very definition, fire resistive building, it retains smoke and heat. If you please, a sprinkler system in such a building, you would humidify smoke and bring the smoke down into the path of travel that must be used for escape.

The National Fire Protection Association in their instructions to firemen in their pamphlets 13 (e) and (f) when they are speaking of firemen entering sprinklered areas to fight fires, they advocate that firemen wear self-contained breathing apparatus to protect themselves from smoke or heat.

If it is necessary for a fireman to wear self-contained breathing apparatus to protect himself from the smoke and heat, God help any patient in the building.

There was talk yesterday of a test on rugs and they talked about flammability, flammability, flammability. Nobody talked about the gases that were given off. I heard a mention that the rug was rated as 83 as compared, I believe, to 0.15 for red oak, but the quality of that smoke was not discussed. Nobody would tell us the components of that smoke, whether that smoke was simply carbon dioxide, whether the smoke contained a toxic gas or whether the smoke contained a lethal gas. These items are extremely important.

There was mention made of the insulation above the ceiling in the Harmar House. The insulation above the ceiling burned or melted down, down as far as room 111, and they had an open cock-loft in that building, and there were evidences in other rooms that there was admission of smoke from the facilities of the building, that smoke did come down because the area had not been subdivided.

There was mention made of the fact that there was a fire drill conducted in April. The Harmar House Nursing Home is not a member of the Ohio State Nursing Home Association. The Ohio State Nursing Home Association conducts monthly fire drills in addition to which in the past 18 months there have been five safety seminars where all facets of safety had been discussed.

There was mention made of designated smoking areas. We have discussed this quite some time ago and, as a matter of principle, the Ohio State Association adopted a resolution calling for a designated smoking area and prohibiting smoking in patients' rooms. It has gone so far as to approach the legislature in Ohio to make this a mandatory requirement.

If I may use your chart for just 1 more minute, I would like to describe the path of this fire and show you why a sprinkler system would not have been effective in this building.

Senator Moss. We would be glad to have you do that, Mr. Regan, if you would.

Mr. REGAN. This fire started in room 104, which is at this position. The path of fire traveled down this corridor, to approximately room 114, and to the westerly wing.

Now, this is a fireproof building and a fire-resistant building. The proper way to ventilate a fire-resistant or fireproof building is by cross-ventilation on the same floor. You break up your draft but this is the condition we had that night in Marietta. We had a fire in room 104 from which the patient had been removed and the personnel neglected to close that door. I submit if the door to that room had been closed when they removed that patient, we would not be here today.

This door was open; there was an exit door just behind the nursing station that was open and there was a main door here that was open. The window to room 104 was broken so our path of travel was this:

We had fire in this room. According to the witnesses, as soon as they removed the patient from the room, the fire had moved to such proportions that they were unable to do anything more about it. However, there were extinguishers laying on the floor at Marietta indicating that they played with this fire while that door was open. So, we had a draft coming in this window.

We had a vent here and we had a vent here and the path of travel was down that corridor. That fire would have traveled so quickly as to outdistance any sprinkler system. The amounts of water that are available to a sprinkler system are limited and the more heads you open up, the less effective your system becomes. This is what would have transpired at Marietta.

I went to look at that building; I saw that building. The fire lines are positive there; there is no dispute on that. In some of the rooms where the doors had been closed, it was visible on the slide yesterday, a smoke stain is evident coming down from the ceiling.

The door to room 106 from which the patients were removed by way of the window showed burning up at the top of the door.

Given all of the conditions of Marietta and having people move in exactly the same fashion they did at Marietta, a sprinkler system would be of no value at all.

There was testimony that neighbors breaking windows helped the fire to advance. As a matter of cold fact, in a building of this type, creating a cross-draft stops your fire.

When fire was moving down this corridor, at any point along that corridor, if you created a cross draft, the fire then would have gone down this corridor and out your cross draft instead of continuing on down through the facility. So, the breaking of the windows did not add to this fire; rather, it slowed it up.

There was mention made yesterday of the death certificates that were part of the evidence, and from the testimony that said the cause of death was smoke inhalation or asphyxiation, they are terms that are simply not good enough; they are not good enough.

If there were toxic gases present there because of the synthetics that were used in that building, I think the entire country should know, not merely for the protection of people in institutions, but for the protection of every person in the United States.

The subsequent deaths of the patients, the patients who died after, who died within the last one, two or three days, I seriously question whether their deaths are attributable to this fire and I wonder aloud how many persons had heart attacks in that building the night of that fire and did not die because of the passage of heat or smoke.

Thank you.

Senator Moss. Thank you, Mr. Regan, for bringing us your very expert testimony and analysis of this fire that occurred.

I agree most heartily with your criticism of the death certificates that simply use a broad general term, smoke inhalation or asphyxiation, without pinpointing the cause. Certainly, that is one thing that ought to be required, that there be an analysis made of the smoke so we would know whether it was carbon monoxide or whatever else that was in there that was the lethal part, if that indeed caused death.

Mr. REGAN. They can be arranged so there are no lethal gases from synthetics. You can get any possible combination of gases and the exposure to those gases to cause death is not a long period of time; it is a relevantly short period of time.

So, I feel that, in addition to flammability tests, I think there should be quality tests to find out the materials.

One of my fears with the testimony offered is that perhaps we may adopt regulations that would cause further death.

I submit, Mr. Chairman, that the Life Safety Code of the National Fire Protection Association is an adequate code to protect life. I don't believe that it should be used only for Medicaid or Medicare patients; I believe it should be used for any patient in any institution any place in these United States.

Senator Moss. I must agree with you on that.

I think the reason Medicare and Medicaid come up is that the jurisdictional powers of this committee and the Congress come through those paths. As far as requiring certain standards in nursing homes or other places where the Federal jurisdiction attaches, it is assumed that if this is required for the patients that come in on either of these two acts, then, of course, it would be applied to everyone who comes in.

Mr. REGAN. I hope so.

Senator Moss. I, first of all, am happy to have you inform me what I had not known, that the Ohio Nursing Home Association had already adopted a resolution, for instance, on the segregation of a room for smoking.

Mr. REGAN. Designated smoking area.

Senator Moss. Designated smoking area.

If that were done, and especially if an attendant were required to be in such a room at all times when it is being used, then we could reduce the dangers considerably, although not eliminate them. We still need these other protections on furnishings, as you know, by knowing what sort of smoke they would give off.

I wonder on this door closing, does the code recommend or would you recommend that a door always have a device that swings it shut?

Mr. REGAN. No, sir. The old buildings are not one-story buildings and when you have a fire in a building there are three possible places you can be in a building: You can be on the floor that has the fire; you can be on the floor above a fire; or the floor below a fire.

The floors above a fire are exposed since the gases or the energy of that fire are exerted upward and they can pass through the interior of the building.

I would hate to close a door on the fifth floor of a building because of a fire on the first and when it came time to open that door again find that some patient had been asphyxiated because that door was closed and that patient was not under supervision.

I would much prefer that the personnel in an institution constantly patrol their areas, watching for passages of smoke and if such takes place evacuate that particular room and close the door to that particular room.

If anybody has ever watched fire departments working at a fire, you will note that they work at the fire floor and the floors above it and they don't close doors; they want to observe every area of the building.

A patient behind a closed door is an unsupervised patient. We don't know if they are having a heart attack or if they are becoming asphyxiated or if in their excitement they are jumping out of windows; we do not know. We do advocate door closers on the smoke barrier doors every 150 feet; we advocate that they be connected through the alarm system in the building in addition to which they be equipped with devices that will work automatically or an individual alarm system, but we do not advocate door closers on the door to each room. It would be dangerous to the patients in any institution. It would constitute a hazard.

Senator Moss. However, in this particular instance, had there been one on 104, after they had taken Mr. Phillips out, you said the fire could have been contained in that room. I can see both sides of it but in this instance it would have been valuable if the door closer had been on the 104; is that right?

Mr. REGAN. Mr. Phillips may have died in 104 if that door closed automatically on the first indication of heat in that room and the door closer would operate the same as a sprinkler system. The heat detection system did report the fire 30 degrees ahead of the sprinkler.

There are much more sophisticated devices now for reporting fires;

there is an infinite variety of them. Yesterday, a witness said that the best system for reporting and extinguishing a fire was a sprinkler system, but he coupled two conditions together. He coupled reporting and extinguishing them—they are separate and distinct.

There are devices that are much more sophisticated than the sprinkler system for reporting the fire.

Senator Moss. Early report.

Mr. REGAN. Early report in any fire is the difference between success and tragedy.

Senator Moss. Thank you.

Mr. Halamandaris has a question.

Mr. HALAMANDARIS. Yes.

I am just a little bit confused, and I hope you can straighten me out.

You are probably one of the foremost fire experts in the country. We are glad we could work you in this morning because you were not on the scheduled agenda. We are glad to welcome you.

I compliment the American Nursing Home Association for taking such a forthright stand here at this hearing today.

I know that the American Nursing Home Association did take a strong stand back in 1967 when Senator Moss' amendment was passed concerning Life Safety Code of the National Fire Protection Association, and it was due in fact, I think, to the efforts of the association that that amendment was passed.

I hope the American Nursing Home Association can help get the same Life Safety Code adopted and implemented into the Medicare program.

Mr. REGAN. No problem.

Mr. HALAMANDARIS. Good. I appreciate that.

What I would like to ask is: Have you had any occasion to become aware of the amendments to the Ohio Building Code that came out of the hearing in May last year, May 1969, before the Ohio Board of Standards?

Mr. REGAN. No, sir.

Mr. HALAMANDARIS. You have no knowledge.

The next question I would ask is: Do you have any knowledge of the Academy of Nursing Homes of Cincinnati? Have you ever heard of that?

Mr. REGAN. I have heard of it but I have no knowledge of their recommendation.

Mr. HALAMANDARIS. Are they a member of the American Nursing Home Association?

Mr. REGAN. I would not know that.

Mr. HALAMANDARIS. I should really call somebody from the Ohio Nursing Home Association to ask that question because the impressions that I have are sort of contradictory. I have been informed that the members of the Ohio Nursing Home Association have tied up in court certain constructive amendments that came out of the Ohio Building Code hearings. These amendments require installation of sprinkler system in older buildings, and because these new requirements are expensive they have been opposed.

Now, am I correct in all this?

Mr. REGAN. I am a very liberal man with other people's money; I don't care how much it costs them. I am concerned with life. When you say "older buildings," I would have to know the type and kind of building. I know very many old buildings that are a lot better put together than some of the stuff that went up in 1967 and 1968 and 1969, but I would not be familiar with it.

But, when you talk money, you cannot equate money with lives; it can never be done. I, for one, will never do it. I will never advise any of the people for whom I consult to talk about money because they are just not compatible.

As far as my relationships with associations is concerned, I don't enter into their internal politics. I don't know what they do. I simply advise them to the best of my ability on matters of fire and safety.

Mr. HALAMANDARIS. Good. I appreciate that statement.

Thank you.

Senator Moss. Well, thank you very much, gentlemen.

We will have to move on.

You both contributed greatly to our record and our information. We are happy indeed that you came to be with us this morning.

Mr. CRON. Thank you.

Senator Moss. We now have Dr. Elio Passaglia and Mr. Malcolm W. Jensen, of the Office of Flammable Fabrics, Institute for Applied Technology of the Bureau of Standards.

Will those gentlemen come forward, please?

We had listed them to come forward with Mr. Jack Bono and Mr. Henry Collins of the Fire Protection Division of the Underwriters Laboratories, Inc. Perhaps those gentlemen would like to come to the table as well.

Mr. Passaglia, we are pleased to have you.

Mr. Passaglia is Chief of the Office of Flammable Fabrics, and Mr. Jensen is the Deputy Director.

We look forward to your testimony.

**STATEMENTS OF MALCOLM W. JENSEN, DEPUTY DIRECTOR, INSTITUTE FOR APPLIED TECHNOLOGY, NATIONAL BUREAU OF STANDARDS; ELIO PASSAGLIA, CHIEF OF THE OFFICE OF FLAMMABLE FABRICS, INSTITUTE FOR APPLIED TECHNOLOGY, NATIONAL BUREAU OF STANDARDS; AND JACK BONO, MANAGING ENGINEER, FIRE PROTECTION DIVISION, UNDERWRITERS LABORATORIES, INC.**

Mr. JENSEN. Thank you.

Mr. Chairman and members of the subcommittee: I am M. W. Jensen, Deputy Director of the Institute for Applied Technology, National Bureau of Standards.

With me today is Mr. Elio Passaglia, Chief, Office of Flammable Fabrics, which is located in our institute. Mr. Passaglia and I consider it a privilege to appear before you to discuss the particular interest of the Department of Commerce and its National Bureau of Standards in the tragic nursing home fire that occurred in Marietta, Ohio, on January 9, 1970.



Our specific concern in this matter relates to our delegated responsibilities under the Flammable Fabrics Act, as amended (81 Stat. 568; 15 U.S.C. 1191), a copy is being submitted for the record.\*

Under authority granted in the statute to the Secretary of Commerce, and delegated by him to the Bureau, we conduct research in the flammability of fabrics and related materials used in wearing apparel and interior furnishings in private dwellings and places of public accommodation in order to provide the technical basis for (1) finding of probable need for flammability standards, (2) proposed standards, and (3) final standards.

On December 3, 1968, the Department published in the Federal Register (15 CFR Part 7; 33 F.R. 17921) also submitted for the record,\* a finding of probable need for a flammability standard for carpets and rugs.

After considering comments on the finding and after the completion of both an in-house technical investigation and a joint industry-Government series of interlaboratory tests, we published in the Federal Register on December 18, 1969 (15 CFR Part 7; 34 F.R. 19812) submitted for the record,\* a finding of need and a proposed standard.

This proposed standard is based upon, and is similar to, Federal Specification DDD-C-95, the purchase specification utilized for a number of years by the General Services Administration in obtaining carpets and rugs for use by the Government. It is essentially a draft-free test, with a small, timed ignition source, designed to eliminate from the marketplace carpets and rugs that ignite readily and that propagate flame under draft-free conditions.

Briefly, the proposed test method for carpets and rugs may be described as follows:

A 9-inch square specimen of the carpet to be tested is dried at 221° F. This is placed in an open-top box to protect it from drafts. A quarter-inch thick steel plate, also 9 inches square with an 8-inch diameter hole, is placed on top of the carpet to hold the specimen flat.

In the center of the hole in the steel plate, there is placed a small (approximately aspirin size) tablet, which goes by the name "methenamine" and is composed of the chemical compound hexamethylenetetramine. This tablet, colloquially called a pill, weighs approximately one two-hundredths of an ounce, and, when ignited, burns with a small (approximately match size) flame for about 100 seconds.

The tablet is ignited, and all burning of the tablet and the carpet is permitted to continue until the flame extinguishes itself.

If the specimen burns 3 inches or more in any direction, it is deemed to have failed the test. If it burns less than 3 inches, it has passed. In order to test a carpet or rug, this procedure is carried out on eight specimens, and seven of the eight must pass if the carpet or rug is to be deemed acceptable under the proposed standard.

Shortly after the nursing home fire in Marietta, we sent Dr. Joseph Clark, a research associate, to the site of the tragedy to obtain samples of the carpet that was involved, and to discuss the fire with appropriate State and local officials who, incidentally, provided outstanding cooperation and assistance.

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\*Retained in committee files.

Subsequent tests of the samples obtained at the Marietta location indicate that the carpets involved will pass the proposed flammability test and thus would be permitted to remain in the marketplace even if the proposed Federal standard is promulgated.

We naturally are deeply concerned about the fire at Marietta and the role that carpet that would have been acceptable under our proposed standard may have played in that tragedy. However, we have been fully aware that certain of the carpets and rugs that would pass the proposed test could be expected to propagate flame under conditions of draft and intense heat found in building fires.

It is important that the purpose of the proposed standard be understood. It seems reasonable to assume that carelessly dropped cigarettes or matches, or inadvertent embers from a fireplace, may cause substantial damage if a carpet or rug is highly flammable. Our aim is first to eliminate such highly flammable materials while we conduct research necessary to identify and measure those characteristics of carpets that produce smoke or propagate flame in fire situations.

Work is now underway at the National Bureau of Standards and elsewhere to arrive at appropriate test methods, including testing equipment, for what is known as a "corridor" test for carpets and rugs—a test that will include controlled draft.

The development of a test system that closely simulates service conditions is a difficult technical task. Draft at floor level cannot be predicted, and the control of very low rate draft in a test chamber is a scientific challenge. Thus, the proposed standard for carpets and rugs is designed to provide protection against one type of hazard while we work on more complex test methods that will identify other possible hazards.

Dr. Passaglia and I will be pleased to attempt to provide answers for any questions that you may have, sir.

Senator Moss. Let's see if I understand this pill test.

You put the pill there and you ignite it with a match?

Mr. JENSEN. That is correct, sir.

Senator Moss. Then you see whether it will go out without spreading a ring three inches in diameter on the rug?

Mr. JENSEN. That is correct, sir. We have examples here, two specimens, one of which passed the test and one of which obviously failed the test.

Senator Moss. Well, it appears the thing we are bothered with here was really the backing on the rug.

Mr. PASSAGLIA. These are two rugs from the Marietta fire; there is a brown one, there is a blue one. Both passed the pill test.

If you test the backs of these carpets with this particular test, you find that the blue one fails and the brown one passes.

Senator Moss. How did that get on there, you say the one that passed?

Mr. PASSAGLIA. This was tested the same way, with the pill, the carpet upside down.

Senator Moss. And this one?

Mr. PASSAGLIA. This one passed.

Senator MOSS. And this one failed?

Mr. PASSAGLIA. Yes. This is a commercial rug.

Senator MOSS. That is a failure?

Mr. PASSAGLIA. Definitely a failure.

This is a pass.

Of the rugs that we purchased from the local market—it is not to be construed as a total market sampling—we tested some 43, and about 35 percent of them failed.

Senator MOSS. Well, if indeed the sample that you show from Marietta passed and yet this carpet figured prominently in a first-class big fire with a lot of fatalities. Apparently this is not a very effective test, is it?

Mr. JENSEN. I think, Senator, it is important to understand, as I attempted to say in the statement, that this is a first generation test. The test is designed to eliminate highly hazardous carpets and rugs. For a later generation standard, we need to develop a solid scientific technique that will produce in an acceptable fashion intense heat and draft conditions. This research is underway now.

Senator MOSS. Well, the people that made the carpeting that is involved here have given us a statement. It has not been presented yet but I would like to quote from it. It says:

For example, the methenamine pill test referred to above is the very test the Carpet and Rug Institute and various government agencies have developed as a reliable flammability standard test for carpets and rugs intended for use as floor coverings. The carpet in question meets and conforms to the recently proposed flammability standards.

It does not sound as though they thought this was just a first generation test, rather they believe that the test was going to clear them in their product.

Mr. JENSEN. I can answer the last part of his statement; he is absolutely right. Apparently it does pass the test. The first part of his statement is yet to be proved.

This test has been utilized by the General Services Administration since 1965, thus we are provided with a basis of experience. I can assure him and you that research will continue and, as a matter of fact, is going on right now to permit us to define more clearly those other factors that bring about flammability of carpets.

Senator MOSS. What about the suggestion that was made that we ought to know what the fumes are that come off of a carpet and backing like that? Are we making any tests in that regard?

Mr. JENSEN. We agree with the suggestion, and the National Bureau of Standards does have a smoke box; we can measure smoke emission. We have not yet attempted to analyze gasses for toxicity as this is really a medical problem, as you know, sir.

Senator MOSS. You do analyze for density of smoke but you have not analyzed it for chemical contents, let's say?

Mr. PASSAGLIA. May I speak to that, Senator?

Senator MOSS. Sure.

Mr. PASSAGLIA. This is not a difficult thing to do. The knowledge is available as are the methods that can be utilized to determine qualitatively and quantitatively the existence of carbon monoxide, carbon dioxide, et cetera. This has been in existence at the National Bureau of Standards for some time.

We have recently completed a study that does not have to do with carpeting, but with bedding, at the Southwest Research Institute. The object of this study was to define the life hazards that arise from bedding.

In this particular study, such gases as carbon monoxide, carbon dioxide, SO<sub>2</sub>, HCN, and so forth, were measured.

I have had discussions with Mr. Guill at the Southwest Research Institute about carrying out a similar study involving carpets and we are in the process of evaluating a research effort in this field.

Senator Moss. This test that you have now proposed on rugs and carpets, is this the only one that has come out since the passage of the Flammable Fabrics Amendments of 1967?

Mr. JENSEN. This is the only published proposed standard; yes, sir. We have published a finding of possible need for a standard on children's wearing apparel. Earlier, we published need for a standard covering wearing apparel generally.

Senator Moss. Why has it been delayed? Why so long in getting moving? Even this announced test for carpets seems to be very inadequate to me. We are in 1970 now. Why does it take so long?

Mr. JENSEN. Mr. Chairman, the amendments were enacted in late 1967.

Senator Moss. Yes.

Mr. JENSEN. The appropriations became available to us in October 1968, as a matter of fact. At that time, we had approximately four technically qualified people available and capable of working on the problem; to revise the facilities, to obtain equipment; to obtain personnel is very difficult. There are not many high-grade people in this field. It takes a period of time.

The design and pursuit of an inter-laboratory comparison which is an effort to prove what is demanded by the statute, practicability and technical feasibility of the proposed standard, takes time, and the actual conduct of the inter-laboratory test takes time.

As you are well aware, sir, this statute has a legislative history that clearly shows the intent of the Congress is that all those who have interest or who are to be affected by a proposed standard be given every opportunity to make their views known.

Senator Moss. Basically, you are saying that you did not have enough personnel and enough funding to do it; is that it?

Mr. JENSEN. This is one of the problems; yes, sir.

Senator Moss. I am sort of like our previous witness: When it gets down to lives, I think we have to sort of brush aside some of these considerations about the cost. Of course, this holocaust that we had in Marietta focuses right now on whether or not we have adequate standards for carpeting and, secondly, why it has taken so long even to get a preliminary first generation test, as you call it.

Were you here yesterday? You were here yesterday?

Mr. JENSEN. Yes, sir; part of the time.

Senator Moss. And saw when we lit the rubber backing and then the carpet, itself. If you noticed, it was just one match that lit the backing and then the same match still burning was put on the corner of the carpet and it burned just about as briskly as the backing of the carpet alone burned.

Mr. JENSEN. I think there are a number of considerations here. One is that the carpet is not used in the vertical position.

Senator MOSS. No; there was draft.

Mr. JENSEN. And it is installed in the horizontal position rather than vertical.

Secondly, under proper conditions, almost anything will burn.

We have demonstrated at the Bureau, for example, you can very easily and with relatively little draft burn steel wool.

As I see the implementation of this statute, it requires the exercise of good sound scientific investigation, a good technical test base, and, of course, very careful enforcement.

Senator MOSS. Well, you are saying that this testing, because the carpet is flat on the floor, has some value in determining flammability.

Mr. JENSEN. Yes, sir. We take the position that this test should be promulgated by the Secretary and will eliminate from the marketplace highly hazardous rugs and carpets.

Senator MOSS. Is GSA using this "pill" test now in testing Government purchases?

Mr. JENSEN. To the best of our knowledge, yes.

Senator MOSS. How long have they been using it, do you know?

Mr. JENSEN. I believe the standard was given effect in 1965, sir.

Senator MOSS. So they had experience with that pill test before it was finally adopted under the Flammable Fabrics Act?

Mr. JENSEN. Yes; one of the bases for our finding was that acceptable carpet is being produced under the standard.

Senator MOSS. Well, I think we have got a long ways to go yet.

I appreciate your coming in to tell us what has been done, but it seems to me we have got to move farther and faster on determining what is safe in public places, at least in places where people are restricted in their ability to get about as for example the nursing home situation. Remember some patients were even fastened in their beds.

Mr. JENSEN. Senator MOSS, I think there is a particular problem in that regard in that this statute is largely directed to introduction in Commerce. There is no doubt that specific test methods and standards could be developed for particular use. The question of implementation is, I think, a very serious legal question. I am not a lawyer; we have not discussed it.

It seems to me, for example, if you and I were to start a nursing home and there was a standard for carpets and rugs, one for general use and one for nursing units, and we went in and bought a carpet for general use because it was less expensive and put it into our nursing home, this would not be, I believe, covered by the existing statute.

Now, this certainly would not prohibit the Department of Commerce from considering the development of the test method and standard for a particular end use, but I believe it was not the intention of the Congress to include that in the enforcement mechanism.

Senator MOSS. We are going to have to have a hard look at that.

Thank you, Mr. Jensen and Mr. Passaglia, for your testimony.

I am having my assistant check. There is a live quorum on and I will see if I am needed to make it. If I am, I will have to have a short recess.

We will begin with the next witness, Mr. Jack Bono, who is the managing engineer of the Fire Protection Division of the Underwriters' Laboratories, Inc.

I am very glad to have you, Mr. Bono. Be glad to hear from you.

### STATEMENT OF JACK BONO

Mr. BONO. Thank you, Mr. Chairman.

My name is Jack Bono. I am a registered professional engineer in the State of Illinois, and my present position is managing engineer, Fire Protection Department of Underwriters' Laboratories, Inc. I have been employed by Underwriters' Laboratories for over 23 years and all of them have been spent in the fire protection engineering field.

One of the activities of my department is to investigate building products to determine their burning characteristics when exposed to standard fire tests.

The information which we develop is used primarily by regulatory authorities such as building officials and fire marshals to ascertain whether products intended for installation in a building can be safely used in accordance with provisions in building codes. Such codes contain regulations which limit the combustibility of wall and ceiling interior finishes, such as wood paneling and acoustical tile. The permissible degree of combustibility varies with the occupancy and the location in the occupancy.

Codes normally have not extended combustibility regulations to include floor covering materials. The reason may be that there have been a limited number of experiences in which floor covering materials have contributed to the spread of fire.

Within the last four or five years, however, there have been some instances of fire spread over carpet materials. This has prompted consideration of the need for tests to measure the flammability of floor covering materials. Underwriters' Laboratories has participated in these discussions through its committee activities and has undertaken experiments on floor covering materials with several test methods.

After the fire in the Harmar House Convalescent Home in Marietta, Ohio, we were contacted by the fire marshal of the State of Ohio who requested the laboratories to conduct tests on samples of the carpet materials selected from the home.

These tests were conducted and a report of our investigation was completed last week. A copy of the report has been sent to this committee for its use.\*

The report describes the tests conducted on samples of nylon carpet removed from unaffected room locations in the nursing home and on a sample taken from a storage area which was reported to be the same as that installed in the hall of the nursing home during the fire. The sample materials were subjected to three tests: the methenamine pill test, the Steiner tunnel test, and a chamber test recently developed by Underwriters' Laboratories, Inc.

The methenamine pill test was conducted in accordance with the "Notice of Proposed Flammability Standard on Carpets and Rugs", (App. 1, Department of Commerce, December 17, 1969).

\*See appendix B, p. 477. Report on the Fire Testing of Carpeting Selected from the Harmar House Convalescent Home in Marietta, Ohio.

The details of the test method are described in the report but it essentially consists of exposing a 9-by-9-inch sample of the carpet to a burning methenamine pill placed in the center of the sample. Observations are made of the maximum char radius.

The Steiner tunnel test is a national standard used for the measurement of flame spread and smoke developed of interior finish materials. It essentially consists of a rectangular furnace in which the test sample is mounted on the lid of the furnace and exposed to an igniting fire from the underside.

As the test material begins to contribute to the igniting fire, flame spreads down the sample. Observations are made of the time and distance of the flame spread and a rating is assigned, based on a scale in which a noncombustible material has a zero rating and red oak flooring has a 100 rating. This equipment is also used to measure smoke generation during a test, and the rating scale again has zero for noncombustible material and 100 as the smoke developed rating for red oak flooring.

A numerical limitation of 75 for the flame spread rating has been specified by the U.S. Public Health Service for regulating floor coverings in hospitals receiving aid under the Hill-Burton Act.

The Chamber Test was recently developed by Underwriters' Laboratories under a research project sponsored by the U.S. Department of Health, Education, and Welfare. This test exposes a sample of floor covering 2 feet by 8 feet in size to an impinging fire at one end. The sample is mounted in the normal floor position. Observations are made of the flame spread over the surface.

Although a failure criterion has not been recommended for this test as yet, performance of carpeting when exposed to the igniting fire for 12 minutes has varied from practically no flame spread to propagation over the full sample length, depending upon the type of fiber, construction and possibly other factors.

These are the results:

In the Methenamine Pill Test, flaming did not propagate over the nylon carpeting materials tested and the char radius was  $\frac{3}{8}$  inch, maximum. All materials evaluated by this test provided measurements well within the permissible char radius of 3 inches and would be classified as "resistant to flammability," as defined by the standard proposed by the Department of Commerce.

In the Methenamine Pill Test, the low-ignition energy was not able to involve the foam rubber backing material, nor measure the adverse influence of the backing with respect to the reduction of heat transfer to the substrate.

The Chamber Test results were similar to the performance of several commercial-grade nylon carpets tested in previous studies with this apparatus. The degree of involvement of the carpet samples during the normal 12-minute exposure to the igniting flame was moderate, ranging from 21 inches to 36 inches.

However, burning persisted after the igniting fire was shut off, and in two of three samples, the flame spread the full length of the sample. One of the samples included the foam rubber backing and this contributed to the flame propagation.

The tunnel test again demonstrated an increase in flame spread produced when the insulative backing material was part of the test sample. The two samples selected from unaffected rooms in the convalescent home were without the backing which had been torn loose during removal from the floor. The flame spread values for these samples were 105 and 140. The sample with a backing resulted in a flame spread of 275.

All of the tunnel test flame spread classification results for the nylon carpeting tested, were in excess of the "Hill-Burton" limitation of 75 and were greater than 100 for red oak flooring.

The presence of the combustible black foam rubber integral backing on one of the tunnel test samples caused a significant increase in smoke generation. Without backing, the carpet samples produced less smoke than red oak in the 10-minute exposure. With backing, in only 4 minutes, the carpet sample produced  $3\frac{1}{2}$  times as much smoke as that generated with red oak in a 10-minute test. Some additional smoke would have developed had the test been continued.

In the chamber and tunnel tests, under continuous flaming exposure, the nylon carpets ignited and propagated flame at a steady rate until a large area of the sample was involved and air temperatures were high enough to produce accelerated convective heat flow, resulting in conditions conducive to sudden and rapid flame spread.

In both tests, the penetration of the carpeting by the test flame caused distortion, blistering and eventual cracking exposing the backing and producing large quantities of smoke.

I think it can be concluded from the work of the laboratories that the nylon carpet material used in the nursing home was of a type which would not readily spread fire when exposed to a small ignition energy source such as a lighted cigarette.

However, when the intensity of the heat exposure is sufficient, the nylon carpeting is capable of propagating flame. It was shown in the chamber tests that when the nylon sample became sufficiently involved, propagation of flame over the entire length of the sample occurred even though the igniting fire was extinguished.

The larger fire exposure in the tunnel test induced flame propagation over the entire length of the sample with backing in 2 minutes.

The tunnel test and chamber test represent a more intense fire exposure than the localized, small ignition exposure of a type represented by the pill test. They therefore measure an ignition condition different from the pill test.

This has been a capsule summation of our investigation of the carpet used in the convalescent home.

If I can assist by expanding on any phase of our work or by answering questions, I shall be happy to do so.

Senator Moss. Thank you, Mr. Bono. You have furnished us with a rather detailed report which we have in our records and which gives us technical information, I think, that we need for the record.

As I have listened to your brief summary this morning, you say that the type of carpeting that they had in the Marietta home would pass the test if it was a small flame like the dropping of a cigarette on the carpeting but that it was a type of carpeting that if there were a larger, more intensive heat source would actually blaze up.



Is that a fair summary?

Mr. Bono. It would continue to burn and when a sufficient heat intensity would be achieved it would propagate, actually travel over the surface.

Senator Moss. So if we were trying to reconstruct as best we can what probably occurred in that room that night, it was that a flame started in the wastebasket that had some other materials to burn on in the wastebasket and that gave it a large heat source so that then it spread on the carpet.

Would you draw inference from what the evidence shows that

Mr. Bono. There seemed to be a relationship between the nature of the fire development within that room and then out into the corridor and some of the large-scale tests which we conducted in this investigation in that in both instances a sufficient heat intensity was created which ignited the carpeting and caused flame propagation.

Senator Moss. Well, I do appreciate having the technical information.

Now, you did say, of course, that it was the carpet backing that caused the intense increase of smoke production; without the backing of the carpeting, didn't generate as much smoke as red oak.

Was that your testimony?

Mr. Bono. That is correct.

Senator Moss. The flame spread rating was from 140 to 105 so that would be class C, would it not?

Mr. Bono. Yes, sir. The usual range for class C is 76 to 200.

Senator Moss. The Hill-Burton safety requirements are that it be class B.

Mr. Bono. At the extreme upper range of class B; yes, sir.

Senator Moss. I see.

So this carpeting without the backing still could not have passed the Hill-Burton requirement?

Mr. Bono. That is correct.

Senator Moss. Well, thank you very much, gentlemen. We appreciate your coming to testify before us today.

Mr. Bono. Thank you.

Senator Moss. Mr. Arnold B. Christen, who is an attorney representing the Dan River Mills Co. will present the statement that was prepared for Mr. Crawford, the president of the carpet division.

I might say for Mr. Crawford that he was here yesterday and we didn't reach him on the witness list and he had to return to his home. He has asked Mr. Christen to come here to read his statement.

We would be glad to have you do that now, sir, if you would.

**STATEMENT OF DAN RIVER MILLS, INC., PRESENTED BY  
ARNOLD B. CHRISTEN**

Mr. CHRISTEN. Thank you, Senator Moss.

My name is Arnold B. Christen. I am a Washington attorney.

I have been asked to read the statement, as the Senator has said, on behalf of Dan River Mills, and the statement is to be read at your request.

It is our understanding that this committee was convened, in part,

as a result of the January 9 fire tragedy at the Harmar House Nursing Home in Marietta, Ohio.

Further, we assume that our statement was specifically requested because carpeting manufactured by a subsidiary of Dan River was in the nursing home during the fire and that Fire Marshal Samuel T. Sides, one of the authorities investigating the tragedy, has stated publicly that the floor covering and the rubber backing contributed to the spread of the fire and was the cause of the heavy, dense, black smoke.

On January 22d, at 12:15 p.m., a Mr. Cunningham of Modern Nursing Home Magazine, phoned and stated that Dan River had been identified as the manufacturer of carpeting installed in the Harmar House Nursing Home, which had been ravaged by a fire in which a number of persons had died. Mr. Cunningham asked for a statement. We told him we knew nothing about this tragedy, but would begin to gather information.

At the request of Modern Hospital Magazine, a companion publication and also a McGraw-Hill trade magazine published in Chicago, Dan River issued a statement on January 30th in regard to questions posed by this magazine's representative, Mr. Howard Lewis. The statement follows:

Greenville, South Carolina, January 30, 1970.—From the information available to Dan River, the carpeting in the Harmar House Nursing Home in Marietta, Ohio was a product manufactured in 1965 at the former Kingston Mills, Inc., a White, Georgia, firm acquired by Dan River in 1964. This carpeting sold under the "Marathon" style name and utilizing domestically-produced space-dyed nylon, was manufactured under commonly accepted standards of quality and was not hazardous in any respect from the standpoint of any known standards of flammability. Since the fire tragedy, the Harmar House carpeting has been tested by the National Bureau of Standards, U.S. Department of Commerce, and by the Laboratories of Dan River's Carpet Division, and has successfully passed today's methenamine pill test method for flammability as promulgated by the Department of Commerce. The carpeting consists of a 100 percent nylon face pile with a high density foam rubber backing. This particular style was discontinued in 1968 in response to changing fashion, consumer, and marketing demands.

The foregoing quotation is intended to advise the committee on what has transpired to date.

During 1965, Dan River sold quantities of carpeting to Wiesler & Cawley, a retail dealer in Marietta, Ohio, who installed a part of the carpeting in the Harmar House. As we pointed out in our public statement of January 30, the Kingston carpeting that our retail dealer installed in the Harmar House was manufactured under commonly accepted standards of quality and was not hazardous in any respect from the standpoint of any accepted standards of flammability for carpets.

Since the acquisition of Kingston Mills, Inc., in 1964, Dan River has consistently and aggressively remained abreast of all developments affecting the safety and quality of our products. For example, the Methenamine pill test referred to above is the very test the Carpet & Rug Institute and various Government agencies have developed as a reliable flammability standard test for carpets and rugs intended for use as floor coverings.

The carpet in question meets and conforms to the recently proposed flammability standards. In fact, the entire commercial carpeting line

of Dan River met these standards in December 1967, when the Federal Flammable Fabrics Act was amended to include carpeting.

In 1965, at the time that this carpeting was manufactured, there existed no national flammability standard for carpets and rugs which would provide protection from unreasonable risk of fire. However, for federally owned or leased buildings, the Federal Government provided a measure of protection against foreseeable fire hazards, such as rapid flash burning or continuous slow burning or smoldering, through the requirement of the Federal Supply Service, General Services Administration, that all rugs and carpets purchased for use in such buildings must comply with the flame resistance criteria of Federal Specification DDD-C-95, carpets and rugs, wool, nylon, acrylic, modacrylic.

Testing shows that the carpeting installed at the Harmar House Nursing Home successfully passed the flammability test procedure of Federal Specification DDD-C-95.

The Harmar House carpeting was a level loop, space-dyed nylon product with a three-sixteenths-inch foam rubber back. Nylon was the most durable and longest wearing carpet fiber known at that time and the nylon selected for this carpet was the best nylon produced by Allied Chemical Co., a major supplier to the industry.

Dan River purchased the space-dyed yarn after it was dyed by Rossville Dyeing, Rossville, Ga. After the carpet was tufted, Dan River sent it to others to be foamed. The high-density foam rubber backing was applied by Dalton Carpet Coating, Inc., Dalton, Ga., a firm which at that time supplied this service to a significant portion of the carpet industry.

At the time, Dan River did not possess the necessary equipment to, perform this process, and used the services of Dalton Carpet Coating Inc., because of its fine reputation in providing this service for other carpet manufacturers. The foam rubber used by Dalton Carpet Coating, Inc., was produced by the Textile Rubber & Chemical Co., of Dalton, Ga.—an industry leader in the production of high-quality latices for carpet backing.

The committee will realize that in 1965 and subsequent years a significant amount of foam-rubber-backed carpeting was produced and sold in this country. In 1968, the first year for which industry figures are available, there were 580,000,000 square yards of carpeting produced—of which over 12 percent, or some 71,000,000 square yards, were foam rubber backed.

While the 1969 figures are not yet complete, industry estimates show an expected increase of over 10 percent in all type carpeting.

Much reference has been made to the Methenamine pill test in the foregoing. This is because Dan River as a company and an industry, along with the National Bureau of Standards, believes this test simulates the most realistic flammability hazard to floor covering products.

The board of directors of the Carpet and Rug Institute, the trade association for the U.S. carpet industry, has adopted the following policy statement on flammability:

The Carpet and Rug Institute, like its predecessor associations which were merged into the C.R.I., representing its member companies which produce a

major portion of the rugs and carpets manufactured in the United States, affirms that as an association and as a group consisting of the carpet and rug manufacturers who make up that association, they are not only safety-conscious but are vitally interested in producing and marketing only products which do not present an undue flammability hazard to the user or consumer.

We have for a number of years individually and collectively worked on ways and means of arriving at a practical, workable, and effective method of testing our products that would enable us to carry out our commitment and to implement our concern in this field. In our opinion, the flammability testing procedure developed by our Technical Committee and currently refined by the Committee meets, to the extent that is workable, this objective, and we propose to urge its use, with such refinements as we may develop, as a consistent technique in making certain that we meet our obligations to the consumer and user of carpets and to the public generally. (4/21/69).

The testing procedure referred to in the above statement is the Methenamine pill test. Further, a committee of the Carpet and Rug Institute has stated that as of 4 years ago, when the Marietta carpet was installed:

The product selected was as safe as the technology of our industry could provide at that time.

It is apparent from what information we have been able to glean from various sources that the plastic wastebasket, wooden night stand and the wood frame, vinyl plastic upholstered chair, which were allowed to burn on the floor covering of room 104 in the Harmar House, generated total heat far exceeding any conditions that carpet or any floor covering must reasonably be expected to withstand.

In this regard, there are several unknowns we are sure this committee will consider before this hearing is over. For example, we do not know what effect the mastic or adhesive used by the installer had on the flammability characteristics of this carpet and its foam rubber backing.

Nor do we know the maintenance and cleaning procedure used or the additive to which the carpet was exposed over 4 years of hard use.

Because of the obvious necessity to employ chemically-based cleaning elements in other than routine housekeeping, we feel sure this committee will wish to consider the cumulative effect these agents had on the carpet—that is, a relationship might exist between the cleansing agents and the fact that, according to accounts we have, the fire burned a more or less straight path down the hallway.

As stated, we were abreast and continue to remain abreast of technical developments regarding flammability. Since acquiring Kingston Mills, Inc., we have utilized the research facilities of Southwest Research Institute to develop, and we now market floor covering products acceptable under the Hill-Burton Act. This act requires that floor covering destined for use in federally financed institutions utilizing Hill-Burton funds pass certain flame spread ratings determined in accordance with ASTM E-84, more commonly known as the "Tunnel" test.

Carpets meeting these ratings—and only these carpets—are advertised by Dan River for hospitals, and convalescent and nursing homes. Our sales force has been indoctrinated and instructed to merchandise only these approved carpets for such institutions.

We trust the foregoing has been helpful.

We wish again to emphasize our sincere interest and concern in this matter and, in this regard, have provided all the information available to us concerning the carpet which was installed in the Harmar House.

We trust we have demonstrated that our carpeting was manufactured under commonly accepted standards of quality, that our testing methods have been determined to be reliable and practical by both the carpet industry and the various Government agencies concerned, and that the carpet in question did meet the flammability requirements as specified by these methods.

Thank you, Senator.

Senator Moss. Thank you, Mr. Christen.

I understand you are reading the statement and perhaps you do not have the background to answer questions. There are only two or three that occur to me.

In the quote that was made on page 2 by Mr. Howard Lewis, he said that the rubber backing of this particular style was discontinued in 1968, in response to changing fashion, consumer and marketing demand.

We interpret that to mean that they no longer market a carpeting like this sample that was taken out of Harmar House.

Mr. CHRISTEN. The particular style, that would be my understanding of that statement. It was, of course, a statement by Dan River Mills.

Senator Moss. I understand it was quoting Mr. Lewis as saying that.

It would be interesting if we knew what change there was, what different kind of style they went to.

Mr. CHRISTEN. I will be glad to determine that and furnish the information.

Senator Moss. If you could send it to me in a letter or memorandum, I would appreciate it.

(The information follows:)

DAN RIVER MILLS, INC.,  
Greenville, S.C., February 19, 1970.

Hon. FRANK C. MOSS,  
U.S. Senate, Special Committee on Aging,  
Washington, D.C.

SIR: This is in response to your inquiry directed to our representative, Mr. Arnold B. Christen, concerning the one sentence contained in the statement he read on Tuesday, February 10 before the Sub-Committee on Long-Term Care of the U.S. Senate's Special Committee on Aging.

The last sentence of our January 30 press release, which was incorporated in its entirety in our February 9 statement on the Harmar House fire tragedy, read as follows:

"This particular style was discontinued in 1968 in response to changing fashion, consumer and marketing demands".

Mr. Christen reported that your question was as follows:

"I would be interested to know if the quoted statement means that that particular carpet product had actually been discontinued".

The answer is yes: We have discontinued that particular carpet product. However, terminology dictates qualification of this answer. The term "style" refers both to a name ("Marathon" in this case) and to construction characteristics. By "style" we mean that this particular color, pattern, and construction are no longer employed on any of our carpeting.

From a generic point of view, we still produce nylon commercial carpeting quite similar to that which was in the Harmar House. The main difference is that the majority of this carpeting is now manufactured from DuPont nylon fiber,

and the color is obtained by the "piece-dyed" method, as opposed to the former "space-dyed" method used with the Allied Chemical Company nylon fibers. In addition, the foam rubber backing is now applied by us and is of a different formulation.

The events which led to the discontinuance of the Marathon carpet were these:

DuPont introduced what it called its "styling nylon".\*\* This was nylon which could be "piece-dyed" or dyed once the carpet had been manufactured. The Allied Chemical fibers we had been using were "space-dyed" nylon, which means that the nylon fiber was dyed before we purchased it. With space-dyeing, the style (pattern and/or color) is obtained by the way in which the different colored fibers are tufted together (or manufactured).

We changed to DuPont nylon because it offered both economic and fashion benefits. First, with such piece-dyed products, we could produce a given carpet line in greater quantity, and at the same time, offer unlimited color combinations. This allowed us to offer our customers more choice of color, to produce larger quantities and, as a result, at lower unit cost. In addition, we could keep more color in inventory and, therefore, respond more rapidly to market demands.

Mr. Christen also reported that you had a question concerning an excerpt from a statement by the Carpet & Rug Institute on the Methenamine Pill Test—specifically, the last sentence of the quote which appeared on page 5 of the Dan River statement, as follows:

"We propose to urge its use, with such refinements as we may develop, as a consistent technique in making certain that we meet our obligations to the consumer and user of carpets and to the public generally".

Mr. Christen said that your question was as follows:

"I would be interested to learn what type of program they have in mind and what general type of testing procedures they intend to develop".

We hesitate to attempt to speak for the industry on this matter. We will advise Mr. George Paules, President, Carpet & Rug Institute, of your inquiry.

We appreciated the opportunity to be of service to you and your Sub-Committee.

Sincerely yours,

R. C. CRAWFORD,  
President, Carpet Division.

Senator Moss. Then I notice, quoting from the Board of Directors of the Carpet and Rug Institute, that the Institute urges testing on carpeting of various kinds with such refinements as we may develop as a consistent technique in making certain that we meet our obligations to the consumer.

From that, I assume the additional methods of testing are being considered trying to update and make more effective the testing. I don't know whether to take some hope from this or not because the pill test seems so inadequate to me. I would like to see some other kind of a test.

Now, I noticed in the statement from Dan River Mills they indicate that they think it was because the fire got started in the desk, in the wastebasket, and elsewhere, that finally the carpet took off.

Well, that is a hazard, too, and we ought to have some kind of a test on spreading flammability, it seems to me, not just a pill test as to whether a dropped cigarette is going to start any kind of a flame.

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\*\*This was a new development which allows nylon to accept dyestuffs in varying proportions, thus creating different dye levels in the same fabric. For example, an all-white, newly manufactured piece of carpeting can be exposed to one dye bath and emerge in several different colors. This is possible because the nylon fibers, while appearing to be alike to the naked eye, are designed to absorb varying degrees and different types of dyestuffs. As a result, a carpet manufacturer can produce larger quantities of a particular line, and only dye that amount of carpet for which orders exist.

Mr. CHRISTEN. Senator, I have no personal knowledge of the C.R.I. plans for future techniques but I will be glad to again make inquiry and furnish you and the committee with a note of the results.

Senator MOSS. Well, I certainly appreciate your coming, Mr. Christen, on very short notice. I appreciate having this in the record because we did want to have information from the Dan River Mills Company since they were involved and their names came up. Certainly we are entitled to know what their position was and get what technical information we could from them.

This tragic event we hope now will give us some guidance that will enable us to better provide standards for nursing homes where people are non-ambulatory so we will never again have a disaster of this magnitude. We hope that is the outcome of these hearings.

I wish to thank all of the witnesses who have appeared before the committee; it has been most helpful. Many of you have sat through these hearings and heard them and I appreciate that.

The committee is always open to any additional information or suggestions that we may get, so we invite you to communicate with us in writing if you would like to do so.

We do not have any further hearings scheduled at this time but as we examine the transcript and determine what we have, it may be that we would have some further hearings on this particular matter.

With that, we stand adjourned.

(Whereupon, at 11:10 a.m., the subcommittee adjourned.)

# APPENDIXES

## Appendix A

### LETTERS AND STATEMENTS FROM INDIVIDUALS AND ORGANIZATIONS

#### ITEM 1. LETTER FROM JULIAN E. SMARIGA, CHIEF STRUCTURAL ENGINEER, OFFICE OF ARCHITECTURE AND ENGINEERING

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,  
PUBLIC HEALTH SERVICE,  
HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION,  
Rockville, Md., February 6, 1970.

Mr. VAL HALAMANDARIS,  
*Professional Staff Member,*  
*Senate Special Committee on Aging.*

DEAR MR. HALAMANDARIS: In response to your telephone request, I am pleased to offer the following comments on fire safety in our institutions, particularly the special problems in those facilities which are charged with the responsibility of care for our older citizens who are in need of fairly constant attention.

It is generally understood that patient safety from accidental fires in these institutions is particularly serious because of the kind of individuals who are accommodated. A large percentage of these patients are severely limited in their ability to walk and must rely on the use of wheelchairs or walkers, or need the aid of attendants. In addition, a significant number are mentally confused for part or most of the time. Thus only a few patients could fend for themselves in a building fire emergency and it is incumbent on the authorities having jurisdiction to provide as fire safe an environment as reasonably possible under these circumstances.

On the whole, the nationally accepted regulations and standards for these institutions recognize the problems noted above, and, as technology advances, are periodically revised and improved to provide the required degree of safety. This has been the underlying philosophy of the Hill-Burton program, which has assisted in the construction of many health facilities in the past 23 years. These standards have been revised from time to time, as required to reflect the changing needs in health facility planning and construction. Our experience with over 10,000 projects involving nearly one-half of the hospital beds in the country, about one-eighth of the long-term care beds and other types of facilities, shows that a good measure of fire safety, from a building point of view, can be and is being successfully provided in these types of institutions since our projects, to our knowledge, have been free from any loss of life due to a building fire.

We have required the use of building materials and methods of construction which would minimize the chance of an accidental fire starting and subsequently spreading beyond its origin to involve other areas. Because of the increasing use of carpets in health facilities, flame spread standards for floor coverings have been adopted. Compartmentation of the building by the use of smoke barrier partitions and smoke dampers in duct systems is called for to cut down on the spread of smoke throughout the building. Alarm systems are required which will directly notify all the building occupants as well as the fire department, if possible, of a fire emergency to prevent possible tragedy attendant to delayed alarms. Properly placed hand operated fire extinguishers are required to cope with small accidental fires while automatic extinguishing systems (such as water sprinklers) are called for in areas of unusual hazard such as combustible storage areas.



Corridors without long dead ends in which patients may be trapped are designed to provide, in conjunction with an adequate number of stairways, a safe means of evacuation if the need arises.

Extensive effort by fire research organizations is being expended in many areas of building design, planning and construction to assure a maximum degree of life safety from fire. However, we would like to mention several problem areas where encouragement of increased progress should be highly beneficial.

The life safety effects associated with smoke and toxicity resulting from building fires are not completely understood at this time. Many of today's deaths result from the effects of smoke and gases rather than from the direct exposure to fire, therefore more basic effort in this area is necessary in order to be able to establish reasonable regulations for their control.

The problem of using flammable fabrics for patient's clothing, bed linens curtains, draperies, etc., has been recognized. Voluntary efforts to promote the use of materials having low flammability characteristics have been less than successful although it is possible to obtain fabrics which are inherently nonflammable and to provide a treatment for conventional materials to render them less flammable. Recognizing the economic factor involved, a positive program to reduce the large use of such combustible materials should be encouraged.

Lastly, we must recognize that accidental fires will occur in spite of all regulatory precautions, and institutional programs should be developed to minimize the life hazard when this happens. Staff members should be adequately and completely trained to cope with these unexpected situations in an efficient manner. Good programs to assure such emergency preplanning are therefore as important as good building standards.

Thank you for the opportunity of presenting these observations on providing and maintaining a fire safe environment for our institutional occupants.

Sincerely yours,

JULIAN E. SMARIGA,  
*Chief Structural Engineer,  
 Office of Architecture and Engineering.*

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ITEM 2. NEWS RELEASE FROM FIRE FIGHTERS, DATED FEBRUARY  
 11, 1970

FIRE FIGHTERS UNION URGES FIRE SAFETY ACT IMPLEMENTATION IN WAKE OF  
 OHIO NURSING HOME FIRE THAT KILLED 32 PERSONS

WASHINGTON.—President Howard McClennan of the International Association of Fire Fighters, AFL-CIO, declared today that the disastrous fire that killed 32 of the 46 patients in an Ohio nursing home a month ago points up the urgent necessity for activating the proposed National Commission on Fire Prevention and Control.

"An active commission, investigating and publicizing fire hazards and how to combat them, would go a long way toward preventing the loss of life and property that results from use of newly developed materials that have been inadequately tested for fire safety," McClennan said. "The longer the nation delays in implementing the Fire Research and Safety Act, the more unnecessary loss of life and property we suffer."

The IAFF has been seeking implementation and funding of the Fire Research and Safety Act since its passage in 1968. As a start, the IAFF has urged President Nixon to appoint and the Congress to provide funds for a National Commission on Fire Prevention and Control which is authorized by the Act.

President McClennan, testifying last summer before a Senate Appropriations Subcommittee, said that "It is imperative that \$500,000 be provided immediately to activate the Commission." The Commission, when activated, is to begin a study and investigation of more effective fire control and fire prevention methods.

McClennan and other IAFF spokesmen have noted that modern-day living conditions require development of new devices for the protection of life and property from fire.

The Ohio nursing home fire has triggered an investigation by the U.S. Senate on the adequacy of government safety standards for nursing homes and other facilities for the care of the aged.

## ITEM 3. STATEMENT OF JAMES B. PHILLIPS, SON OF LYLE W. PHILLIPS

My name is James B. Phillips. I am the son of Lyle W. Phillips who was the patient in the room in which the Harmar House fire started on January 9, 1970. This is my mother, Louise Phillips, the wife of Lyle W. Phillips.

My mother and I were very upset by the written report and the news conference of the Ohio State Fire Marshal and the subsequent comment upon his statements by the news media which insinuated that my father was the cause of this fire when we and everyone else acquainted with his physical condition knew that it was physically impossible for him to have started this fire. My father suffered numerous strokes in recent years which left him over fifty percent paralyzed. The last seven months he has been a complete bed patient, he has been unable to feed himself, he has been unable to raise himself up in bed, he has been unable to walk even with assistance, he has been unable to light his own cigarettes, he has been unable to drink water from a glass without assistance, he generally has had no control of his bowel and kidney functions, he has been mentally disoriented much of the time as to time and place, he has been unable to get in or out of bed or a chair without the assistance of two aides, he has very little dexterity or coordination with his hands or fingers, he has burnt his fingers several time trying to hold his own cigarettes, and his limbs are so emaciated that he is unable to support his body upon his legs.

This is the same person whom the State Fire Marshal and the news media have characterized as stomping out cigarettes in his room and having careless smoking habits which added up to the Harmar House fire. This is the same person whom investigators from the State Fire Marshal's office endeavored without success to get Harmar House employees to say was "sneaking smokes" in his room. These same investigators even tried to get Harmar House employees to say that they had heard rumors that my father was "sneaking smokes" in his room, also without success. The truth is that Lyle W. Phillips never smoked a cigarette after he arrived in Harmar House six months ago unless someone lit one for him and stood by watching him while he smoked it under extremely strict supervision. It actually taxed his abilities to place a cigarette in his mouth and inhale therefrom, and everyone associated with Harmar House knew that he wasn't physically capable of smoking without assistance.

Realizing these facts and being very distressed by these malicious insinuations stemming from the State Fire Marshal's statements, my mother and I undertook our own investigation of the events leading up to the fire in an attempt to clear my father's name. We have both reached the conclusion that the investigation conducted by the State Fire Marshal's office, his report and his news conference of January 22nd were the end product of incredible ignorance or a deliberate attempt to shield some organization from its financial liability for the destruction of the lives lost in this fire. We arrived at this conclusion partly because of the ease with which we discovered the following facts which have not as yet been disclosed by the State Fire Marshal:

The fire started inside a plastic wastepaper basket in my father's room which was located at least six feet from the nearest point of my father's bed. Marietta Fire Chief, Beman Biehl, stated this fact was established by the fire "V" mark on the wall commencing at the same elevation as the top of the plastic waste container burnt up in the fire, but which had been setting against the wall immediately before the fire started. This conclusion is confirmed by the testimony of the aide who rescued my father from the burning room; and my father also states that when he first noticed the fire, it was coming from the trash container.

Second, it was not an unusual practice for some Harmar House employees to take a smoke break in my father's room. On the afternoon of the day of the fire my mother observed cigarette butts in the ash tray in his room with lipstick marks on them that could not have gotten there except from female nursing home employees. My father also states that many employees smoked cigarettes in his room from time to time.

Third, on the night of the fire shortly after 9:00 P.M. o'clock, two of the nursing home aides came into my father's room to get him ready for bed. He had earlier been left sitting in his rocking chair located at the foot of his bed approximately fifteen feet from the plastic wastepaper basket. One of them got a cigarette for him and lit it with one of his two cigarette lighters, then lit a cigarette for herself and smoked it while seated on one of the chairs in the room, and proceeded to

watch the television program, "Here Come The Brides", with my father until the program ended at 9:30 P.M. o'clock. Then the two aides lifted my father into bed and left him there lying on his back.

One of these aides freely told my mother, me and insurance adjusters that both she and the other aide as well as my father were smoking cigarettes while seated in his room that evening shortly before the fire. However, she insists that she was never told and did not know that it was against regulations for her to smoke in a patient's room. She is also certain that my father's cigarette butt was placed in a metal ash tray which she, herself, left setting on top of the dresser at the foot of his bed when she left the room that night. However, the other aide steadfastly denies that anyone other than my father smoked in his room that evening, and she denies sitting down in his room that evening. She also states that she, herself, took my father's cigarette butt and discarded it, not in the ash tray, but in the commode in the adjoining bathroom. The investigators from the State Fire Marshal's office apparently were so intent upon casting suspicion upon my father that they never asked either aide if either of them were smoking in my father's room that night. I am sure each of you is sophisticated enough to realize that Harmar House and its liability insurance carrier might not be financially liable for the deaths of these patients if the blame could have been fastened to my father.

Fourth, within four hours after the fire and before either aide had been questioned about smoking in my father's room that night, my father told the Administrator of Harmar House in my presence and in the presence of another man that one of these two aides threw a cigarette in the container in which the fire originated while she was in his room that night. By this revelation we do not mean to confirm that an aide did in fact throw a lighted cigarette in that inflammable container that night because all of us know that my father suffered brain damage from his strokes and his statements have not always been true or coherent since his strokes. However, I do know that my father made this statement to a person in authority, and this statement would certainly be entitled to as much weight and notoriety as the State Fire Marshal's conclusion that this invalid man admitted stomping out cigarettes on the floor. One aide did tell the State Fire Marshal investigators that she discarded a napkin in that wastepaper basket that night while she was in my father's room.

Fifth, every employee of Harmar House questioned by the State Fire Marshal investigators stated that she never knew of my father "sneaking" a cigarette and never heard any rumors to that effect. Every employee questioned told the investigators that my father could not physically operate a cigarette lighter nor could he physically light a cigarette on his own without assistance. They were quite positive in declaring that he could not open a drawer from his bed to obtain cigarettes on his own.

Sixth, when the aides left his room at about 9:30 P. M. o'clock that evening, both safety rails on my father's bed were completely raised. Photographs of the scene taken immediately after the fire corroborate this. Thus, my father would necessarily have to have thrown a cigarette or match up over this raised bed rail to get it in the inflammable wastepaper basket while lying on the flat of his back.

Before the fire there was not even one cigarette burn on this carpet in my father's room, and in my opinion no one could "stomp" out a cigarette on that particular rug without leaving a burn in it. They watched my father too carefully to permit him to even drop a cigarette on the floor, let alone stomp it out. During my father's six month's stay in Harmar House, he wore houseslippers less than ten percent of the time. The rest of the time he wore only socks. There were never any cigarette burns on his feet or on his socks.

Perhaps the most startling revelation in our investigation was furnished by the Marietta Fire Chief. Chief Biehl advised me that both metal cigarette lighters that were in my father's room before the fire and the metal ash tray which the aide placed on top of the dresser at the foot of his bed as she left the room are all missing. Chief Biehl told me that the room was sealed shortly after the fire and that a careful search by his office and the State Fire Marshal's office has failed to locate any of the three missing items. We can only speculate as to who removed them from this room shortly after the fire, and why.

It may be true that no one will ever be able to conclusively prove who or what started the fire, but it is easily proven that the fire started in the plastic wastepaper basket and that it was physically impossible for my father lying on the flat of his back in a hospital bed with the safety rails completely raised to

have tossed a lighted match or cigarette from his bed six feet away over a night stand and into that small inflammable container setting on the floor.

The insurance company investigators told me that they had corroborated my father's statement that Harmar House personnel were smoking in my father's room shortly before the fire; all of the fire investigators knew that the fire originated in this plastic wastepaper basket and publicly condemned its use; all of the investigators knew that this inflammable receptacle was located at least six feet away from my father's bed; all of these investigators and everyone connected with Harmar House had the means of knowing my father's physical and mental condition and of his inability to have thrown a match or cigarette from his bed into that receptacle more than six feet away; all of these investigators knew that he was not physically able to "stomp" out cigarettes on the floor of his room; and all of these investigators knew that my father never smoked alone in his room. Yet, no one except my father's friends and some of the relatives of patients killed in that fire have come forward to defend his name against these horrible and totally unwarranted accusations.

We do not intend to cause any individual any embarrassment or grief by these revelations. Indeed, my mother and I shall be eternally grateful to Doris Watts for her heroic act in entering my father's burning and smoked filled room and dragging my father out of there to safety at considerable personal risk to herself. Rather, we use this means to make public what we have uncovered to clear my father's name in the short time he has left on this earth so that he will not go to his grave falsely accused of the deaths of all of those wonderful people when he could not possibly have been instrumental in any way in causing their deaths.

We do not know whether this news conference will cause the State's Fire Marshal's office to take another look into the matter before its final report or not; we hope so but we fear that this will cause it to compound its illogical public insinuations. Therefore, we conferred this morning with the Prosecuting Attorney of Washington County, Ohio, and urged him to institute a Grand Jury investigation as to the cause of this fire and to make the result of this investigation public so that the world may confirm the facts we have recited to you today. We intended to present written statements or tape recorded statements of the two aides who were in my father's room the night of the fire to corroborate the things we have told you today.

However, between the time the two aides agreed to give such statements to us last Saturday and when we went to record their statements on Monday of this week, two days later, their supervisor in Harmar House instructed the aide who admits her smoking not to make any statements. Consequently, only an official investigative body can officially confirm in writing what we have said here today. The Prosecuting Attorney has not yet promised us that he will institute a Grand Jury inquiry, and during our conference with him, the chief investigator from the State Fire Marshal's office, who was then present, told us to stay in West Virginia. Therefore, we urge you members of the news media to encourage a full investigation and a complete public disclosure of the results of that investigation to the end that all facts concerning this matter may come to light and that the truth may not be concealed any longer.

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#### ITEM 4. PREPARED STATEMENT OF MARY ADELAIDE MENDELSON, PLANNING CONSULTANT, NURSING HOMES, CLEVELAND WEL- FARE FEDERATION

I am Mary Adelaide Mendelson, Planning Consultant on nursing homes for the Cleveland Welfare Federation. The Federation is a private organization whose function is to plan and coordinate the health and welfare activities of both private and public agencies in the metropolitan Cleveland area. As such we have had a history of working to improve standards for nursing homes. We are naturally concerned about these hearings.

We are not here today to describe a number of inconsistencies relating to the Harmar House fire. I refer to such things as an officer for the Ohio State Health Department stating to us on the day of the release of the Fire Marshal's report, that the staff on duty on the night of the fire was one Licensed Practical Nurse and four aides while the fire Marshal's report lists the number of regular employees on duty as four. The number given by the Health Department official meets the

number required by the State licensure regulations for a home licensed for 56 beds; the number given by the Fire Marshal meets the requirements for 46 patients. Harmar House is licensed for 56 patients.

Since this is a hearing which must be concerned with national problems, as tempting as it might be to relay the discrepancies, we will use the fire as the means of pointing out some weaknesses in the operation of the federal programs relating to nursing homes.

#### MEDICARE STANDARDS

The Medicare standards are minimal although the Medicare supported home has the aura of being the best. A look at this one area of fire safety exposes some weaknesses in the Medicare regulations.

The federal requirements suggest that the surveyor, or inspector, consider as only a guide line the presence of a sprinkler system in special areas. Harmar House did not have sprinklers because the Ohio regulations state that buildings of such a structure as Harmar House do not need sprinklers. But Ohio permits carpets and draperies which have little or no resistance to fire in such a building—a situation which should then necessitate a sprinkler system. The combination of Medicare regulations being guidelines only and of Ohio's inadequate requirements resulted in 32 people's death. It is our belief that Medicare requirements should be strengthened and that one set of stronger regulations should apply to all extended care facilities in the country.

We understand that a majority of the extended care facilities in the nation are certified despite deficiencies. The surveyor must decide which deficiencies are serious enough to recommend that the home be ineligible. Medicare advises the State agency making the determination on eligibility that a home must be in substantial compliance with the regulations. Substantial is a rather difficult word to define. Does it mean that 51% or 75% or 90% of the guidelines must be observed by a particular home? If substantial should mean that 90% are observed, perhaps one of the ten percent, not met, may, in fact, be a most serious deficiency. To the bedfast patient it may be far more serious that there is no sprinkler system than that there is a grab bar in the bathroom. We think that there should be some system with which to weigh the seriousness of each deficiency and some definition given to the word "substantial" which applies to all extended care facilities alike. Thus, when we are told that 70 to 90% of the homes in the country are certified despite deficiencies, we should be confident that that means, in spite of minor deficiencies, and few in number.

The fire at Harmar House illustrates a grave weakness in the control of such a vast program as Medicare by the Bureau of Health Insurance. Medicare has delegated to the State agency the responsibility to inspect and certify the homes and to respond to complaints about the homes. The Bureau of Health Insurance knows only what the State agency tells it about any home. It has no inspectors of its own which make independent spot checks. In the case of Harmar House we can assume that the surveyor of the home ascertained that the home had an emergency power system. Thus one of the guide lines had been met. The Bureau of Health Insurance has no way of knowing if the system is there, in fact, and, in fact, can operate. Even as of now, the Bureau probably does not know that the emergency system failed to operate, and the home was in total darkness almost immediately upon the outbreak of the fire.

Once the fire had killed the 22 patients, the Bureau of Health Insurance still had to await upon the State for the explanation. In this case, the Fire Marshal issued a report. That, to date, is the official reply from the State to the Bureau—so the Bureau told us.

The Fire Marshal's report is perhaps most interesting for what it does not include. Unmentioned are the evacuation plan, the failure of the emergency power system, the time of the alarm, the time of the subsequent arrival of the fire department, the number of firemen who first responded, the time consumed in removing the patients. The report fails to detail the actions of the regular employees which should be of concern to the Bureau who has set the standard that there must be an evacuation plan. Even neighbors who arrived prior to the fire department claim that they were never interrogated by any investigators.

In short, the report in essence states that there was a fire which started in room 104 in which there were certain furnishings which were destroyed by the fire. The report does tend to place the responsibility for the fire on a discarded cigarette. It then says, and I quote, "Mr. Philips, the occupant of room 104, admitted to

the investigators that he sometimes stomped his burning cigarettes out on the floor. There was no other apparent source of ignition in the area." Mr. Phillips is the only name, other than those of the investigators, mentioned in the report.

Depositions taken from employees, patient's files (claimed to be in tact), the list of patients, the photographs were not attached to the report. There is nothing beyond the Marshal's sketchy report on which to make a judgment. The Bureau has delegated its control of the program even to the extent of being satisfied, apparently, with a report that ignores the ineffectiveness of the regulations for which Congress designated Social Security as the responsible agent.

#### MEDICAID

It is equally important to question the action of Medical Services Administration relating to the fire. The State Welfare Department claimed it had no patients in the home, and therefore, had no responsibility. The fact that Harmar House has a vendor number and has received, in 1969, reimbursements under the Medicaid program for a few patients should mean that it is or was a nursing home under Title XIX jurisdiction. Since the State denied the presence of Medicaid money, that ended the Medical Services activities.

Had, however, the fact been recognized that Title XIX money had gone to the home, Medical Services Administration would have been powerless to act. Its three member office must depend upon the State agencies. It, like the Bureau of Health Insurance, is powerless to investigate on its own. It would appear that the only difference between its involvement and that of the Bureau is that the Bureau did receive the fire marshal's report; Medical Services Administration received nothing. Worse still, it had no way of knowing that it was entitled to something; it had no way of knowing that it had patients in the home during 1969 since it depended upon the State Welfare Department for such information.

#### COMPLAINTS

Mr. Phillips age 76 in whose room the fire started is said to have admitted stomping his burning cigarettes out on the floor. On January 29, the Phillips' family denied the possibility of Mr. Phillips' physical ability to stomp out a cigarette or throw one into the waste basket. They say he is more than 50% paralyzed, even unable to feed himself. To make this denial, the family called together the news media and, with their lawyer present, in the Marietta Council Chambers issued their statement. Absent is the sending of their statement with its findings to the Bureau of Health Insurance or Medical Services Administration—those administrative arms charged with the responsibility of protecting public funds and human lives.

And still missing from any known official report are the medical files which would reveal Mr. Phillip's true condition. These files, said to be intact, are to be reviewed later, one news story indicates.

Should, however, a copy of the Philips' statement arrive at either office, the response would be the same. The State agencies would have been asked to comment. Since the State agency, in this case the Fire Marshal, had already indicated that a discarded cigarette had caused the fire and had mentioned only one source of a cigarette; namely, Mr. Phillips, since the fire marshal had investigated the fire, it is probable that the State would have reworded its original report but in essence have left the original investigation intact. Health, Education, and Welfare has established no method by which the public can complain to it and have the federal government look into the merits of the complaint. Everything is referred back to the source which was the cause of the complaint.

We believe that Medical Services Administrations must increase its manpower and must assume the position that it has a responsibility to the public to watch the expenditure of its dollars and assure the public of its interest in the patients for whom it is expending the money. It must be able to go into a State and oversee its responsibility; it must be able to enter a home; it must be able to obtain the facts first hand.

#### SAFETY REGULATIONS

The Harmar House fire points to another weakness in safety regulations for nursing homes. Medicare regulations, we have said, are not strong enough. We have asked that they be strengthened. Medicaid regulations now mandate that

Title XIX homes meet the Life Safety Code of the National Fire Protection Association. There are still other homes, however, which are covered by neither program and yet are supported by federal dollars. These are the intermediate care facilities. We can estimate that there are some 6,000 homes in this category.

It might interest this committee to know that in May 1969, our Ohio Board of Building Standards met to change the building code for homes built prior to 1958. Reference was made to the Fitchville Fire of 1963 in which 63 patients lost their lives. Questions were raised regarding the need for an automatic sprinkler system. I will quote a statement made by the representative of the largest Ohio nursing home organization. He said "as to the Fitchville situation \* \* \* This has been going back and back to that \* \* \* a case of which the governor's office was fully aware long before the fire ever occurred, a situation that all of the inspectors involved were fully aware of long before the fire ever occurred. Whoever was responsible for seeing that the pond was kept full simply didn't do their job." Thus died 63 patients. Later in the hearing, the State electrical inspector stated, and I quote, "and I have a list of some other nursing homes where it is just as bad today as it was before Fitchville ever started." (May 1969) Indeed, the 63 patients might believe they had died in vain.

The Board of Building Standards did, in spite of the objections of the nursing homes, and of the *State Health Department*, include in the new regulations a requirement for a sprinkler system. The nursing homes immediately opposed this requirement by tying up the standards in a court case, still unsettled, *The Academy of Nursing Homes of Cincinnati, et al, Plaintiffs, vs The Ohio Board of Building Standards*.

We urge that this committee recommend that Congress amend section 1121 of the Social Security Act so that the homes presently not covered by the social Security amendments will be provided the standards of safety to help us avoid another Harmar House tragedy.

## Appendix B

### REPORT ON THE FIRE TESTING OF CARPETING SELECTED FROM THE HARMAR HOUSE CONVALESCENT HOME IN MARIETTA, OHIO, BY UNDERWRITERS' LABORATORIES, INC., NORTHBROOK, ILLINOIS

#### INTRODUCTION

On January 9, 1970 at 9:57 P.M., according to reports, a fire broke out in a patient's room in the Harmar House Convalescent Home of Marietta, Ohio and before it was brought under control, a number of the occupants had lost their lives or were injured.

The Fire Protection Department at Underwriters' Laboratories, Inc. in Northbrook, Illinois was contacted by Mr. Samuel T. Sides, Fire Marshal of the State of Ohio, on January 16, 1970, for the purpose of arranging for a series of fire tests on carpeting materials which were being investigated as a possible contributory factor in the nursing home fire. The Laboratories agreed, as a contribution to public safety, to conduct an investigation of the burning characteristics of the carpeting materials. Following a discussion of the Laboratories' floor covering fire testing capabilities, arrangements were made for appropriate quantities of the carpeting materials in question to be selected from the Harmar House Convalescent Home by a representative of the Division of State Fire Marshal of Ohio and brought to the Laboratories. On January 19, 1970, Mr. Eugene L. Jewell, Chief, Arson Bureau of the Division of State Marshal of Ohio delivered the selected carpet samples.

During Mr. Jewell's visit, plans for the fire testing of the samples were formulated. Although currently no single fire test is recognized as a National Standard for evaluating the hazards associated with the burning of carpeting and other floor covering materials, the 25-ft Steiner tunnel test, the modified methenamine pill test, and the 8-ft chamber test are being used by testing and research laboratories to provide data for certain regulatory agencies. Since the Laboratories has testing capabilities for each of these tests, it was requested that information be developed on the selected carpet samples using all three fire test methods.

By way of review, the Steiner tunnel test was developed at Underwriters' Laboratories, Inc. and is a national standard for use in determining the surface burning characteristics of interior finish building materials. It has been used to evaluate the flammability of floor covering materials, largely as a result of a directive issued in 1965 by the Architectural and Engineering Branch, Division of Hospital and Medical Facilities of the U.S. Public Health Service, regulating floor coverings in hospitals receiving aid under the Hill-Burton Act. This regulation imposed a numerical limitation of 75 for the flame spread classification of floor coverings as determined by the tunnel test.

The methenamine pill test has been in existence for a number of years, but it has been recently modified as a result of experimental work and study by the U.S. Department of Commerce, National Bureau of Standards, in cooperation with various consumer, industry, and technical groups and has been published in the Federal Register as a proposed flammability standard for carpets and rugs.

The chamber test was recently developed by Underwriters' Laboratories, Inc. This test method will be described in detail later in this report.

#### REPORT OF INVESTIGATION

##### TEST MATERIALS

The samples supplied for this investigation consisted of four nylon carpeting materials, differing in color, weight, and backing as indicated by Table I. Some of the information in the Table was provided by the Office of State Fire Marshal; other information was developed at Underwriters' Laboratories, Inc.



TABLE I.—TEST SAMPLE DESCRIPTIONS

Fiber type	Prevalent color	Weave	Nominal pile height (inches)	Estimated weight (ounces per square yard)	Backing		Remarks
					Primary	Secondary (Integral)	
Nylon.....	Green.....	Loop.....	$\frac{1}{8}$	52	Jute.....	None <sup>1</sup> .....	Removed from an unaffected room location.
Do.....	Orange-brown.....	do.....	$\frac{1}{8}$	52	do.....	do.....	Do.
Do.....	do.....	do.....	$\frac{1}{8}$	85	do.....	Nominal $\frac{1}{4}$ -in. black foam rubber.	Do.
Do.....	Blue.....	do.....	$\frac{1}{8}$	75	Jute latex.....	do.....	Taken from a storage area. Reportedly the same as that installed in the hall during the fire.

<sup>1</sup> Because an adhesive was used to secure the carpeting, the secondary foam rubber integral backing was almost totally torn away from the primary backing during removal of these materials from the concrete floors.

## TEST METHODS AND RESULTS

### MODIFIED METHENAMINE PILL TESTING

A total of 32 individual pill tests were conducted on the carpeting materials. In accordance with the "Notice of Proposed Flammability Standard on Carpets and Rugs" (App. 1, Department of Commerce, December 17, 1969), the testing procedure requires eight samples of each type of carpeting to be tested.

The test apparatus consists of a 12 by 12 by 12-in. asbestos board test box, open at the top and fitted with a mirror for making observations, a 9 by 9-in. steel plate with an 8-in. diameter opening in the center and No. 1588 methenamine tablets. The tests are conducted in a draft-free hood with the specimens placed in the floor position of the test box.

A methenamine pill is placed in the center of each test specimen and ignited with a match. Observations include the time of burning, char radius and examination of the effect of the burning on the carpet and its backing.

All samples were cut to 9 by 9-in. size and preconditioned per ASTM-D-1776-67 procedure, followed by drying in a circulating air oven at 105 C to constant weight. A desiccator is used to keep the samples at the oven dry condition prior to testing.

A single failure criterion based on a maximum char radius of 3 in. (burning to within 1 in. of the edge of the opening in the steel plate) and allowing one out of eight samples to fail is used.

Table II shows the results of the "pill" tests in summary form.

TABLE II.—MODIFIED METHENAMINE PILL TEST RESULTS

Sample description	Maximum char radius (inches)	Duration of burning (minutes)	Pass (P) or fail (F)
Green nylon carpet without integral backing.....	$\frac{3}{8}$ - $\frac{5}{8}$	1.52-1.72	P
Orange-brown nylon carpet without integral backing.....	$\frac{1}{2}$ - $\frac{3}{8}$	1.53-1.67	P
Orange-brown nylon carpet without integral black foam rubber backing..	$\frac{3}{8}$ - $\frac{3}{8}$	1.61-2.48	P
Blue nylon carpet with integral black foam rubber backing.....	$\frac{1}{2}$	1-56-1.99	P

Note: The appearance of typical samples after exposure to the methenamine pill test is shown by fig. 1.

### CHAMBER TESTING

Three fire tests were conducted on the carpeting materials using a chamber test recently developed by Underwriters' Laboratories, Inc. under a research project sponsored by the U.S. Department of Health, Education, and Welfare.

The fire test chamber is a sheet metal enclosure lined with insulating brick on the sides and ceiling, measuring 10 in. in height, 22 in. in width and 10 ft. 6 in. in length. The floor of the chamber is a movable steel platform with a water trough around the periphery to provide an air-tight seal and a sheet of asbestos-cement board as the top surface. One end of the chamber is provided with a 7 ft long sheet-metal, air inlet duct assembly fitted with a 2 in. thick aluminum honeycomb

air-straightener. The flue end of the chamber is provided with a square-to-round transition piece leading into a sheet-metal exhaust duct. The exhaust duct is provided with an adjustable damper assembly to regulate the velocity of the fan-induced air movement through the chamber. A multiple hole gas burner situated at the inlet end of the chamber delivers flame directed at a nominal 22-deg. angle against the sample on the floor of the test chamber.

Prior to the chamber fire testing, preheating calibration runs are made to bring the pretest chamber lining and air temperatures within prescribed limits. These temperatures are measured with No. 18 chromel-alumel thermocouples. The chamber lining temperature is measured by a thermocouple inserted into the mid-point of the chamber ceiling. The chamber air temperature is measured at the flue end of the chamber with a set of thermocouples extending 5 in. vertically into the air stream. For purposes of calibration, the lining and air temperatures are maintained within the limits of  $110 \pm 5$  F and  $95 \pm 5$  F, respectively.

In addition to temperature requirements, air velocity is measured immediately prior to each test using a draft manometer and direct-reading velometer. Through adjustment of the exhaust damper, the initial air velocity is set at  $100 \pm 5$  F.P.M. During testing, reductions in air velocity, due to the expansion of the heated air in the chamber, are allowed to occur.

All of the chamber test samples were cut to 2 by 8 ft. in size and dried under accelerated conditions at 140 F for 24 hr followed by conditioning to constant weight at  $70 \pm 5$  F and 35-40 per cent relative humidity prior to testing.

A continuously applied 540 Btu/min diffusion flame (natural city gas), simulating an established, localized fire, was employed. After preheating and regulating air flow, a 2 by 8 ft test sample was laid on the floor platform and the test flame was applied to the specimen surface for 12 min. Flame propagation measurements were made by observing the distance of flame travel (1 in. increments) from a location immediately below the burner, using the point at which the flame diverts from the sample surface.

Following the 12 min exposure, the test flame is extinguished and without adjustment of airflow, observations were made regarding the tendency for sustained flaming of the sample. The test sample was then removed from the chamber and examined.

In order to evaluate the flame propagation, a mathematical expression, resulting in a single numerical value referred to as an Index, is employed. The Index is calculated by expressing the distance of flame propagation as a ratio (quotient) with respect to time, by one of the following formulas:

1. For flame travel partially traversing the 8 ft. specimen—

$$I = \frac{D_p}{12}$$

Where,  $I$  = Index

$D_p$  = Maximum flame travel during 12 min. exposure, in.

2. For flame travel fully traversing the 8 ft. specimen—

$$I = \frac{96}{T_p}$$

Where,  $I$  = Index

$T_p$  = Time for flame travel to traverse 8 ft., min.

The results of the three chamber tests are presented in tabular form in Table III. For comparison purposes, it should be noted that previous studies with the chamber test indicate that the wool carpets which were tested with and without underlayments developed indices of 1.0 or less; certain polypropylene carpeting tested with an underlayment, for example, developed indices from 15.0 to 19.0.

TABLE III.—CHAMBER TEST RESULTS

Sample description	Flame propagation distance during exposure to test flame (inches)	Index, I	Duration of sustained flaming and distance of propagation after removal of test flame	
			Minutes	Inches
Green nylon carpet without integral backing .....	21	1.75	28.0	40
Orange-brown nylon carpet without integral backing .....	22	1.83	92.0	196
Blue nylon carpet with integral black foam rubber backing ..	36	3.00	3.8	196

<sup>1</sup> Full sample length.

The appearance of the three samples after chamber testing is shown by Fig. 3.

The flame propagation that occurred after removal of the test flame during the testing of blue nylon carpet with an integral black foam rubber backing, is represented graphically in Fig. 3. Figure 3 also contains flame propagation vs. time curves for the green and orange-brown nylon carpet samples.

#### TUNNEL TESTING

Three "tunnel tests" were conducted in accordance with the "Standard Method for the Fire Hazard Classification of Building Materials" (Underwriters' Laboratories Standard UL723, Third Edition, October 1968). This method provides for the development of flame spread and smoke generation measurements on a classification scale having untreated red oak flooring as 100 and asbestos-cement board as zero.

The maximum distance the flame spreads over the length of the sample from the end of the 4½ ft., 5000 Btu/min., igniting flame is determined by observation. The calculated value for flame spread classification is derived by expressing the flame spread for this material as a percentage of the flame spread for untreated red oak. The following formula was applicable to the flame spread condition observed during this testing:

$$C = \frac{5.5}{T} \times 100$$

Where:

C = Classification

T = Time to traverse 19½ ft. (min.)

And 5.5 is the calibration time required for flaming to transverse the full length (19½ ft.) of a red oak test deck.

The smoke generation measurements are made during the test by continuous monitoring of the output of a photometer circuit operating across the furnace flue duct. The calculated value for smoke-developed classification is derived by expressing the area developed under a transmittance-time curve for the test material as a percentage of the area under a calibration curve for untreated red oak.

Each of the three 20 by 24 ft. samples, consisting of three 20 by 96 in. sections, were tested on ¼-in. thick asbestos cement board. Since samples are mounted against the ceiling of the tunnel, the carpet sections were adhered to the asbestos cement board substrate using A. P. Green Refractory Cement so that they would remain in position during the test. Previous experiments have shown that the refractory cement does not contribute to the flame spread or smoke.

All of the test samples were dried under accelerated conditions at 140 F for 24 hr followed by conditioning to constant weight at 70 ± 5 F and 35-40 per cent relative humidity prior to testing.

The flame spread results of the tunnel tests are given in the following tabulation (Table IV):

TABLE IV.—TUNNEL TEST RESULTS

Sample description	Flame spread distance (feet)	Time for spread, (minutes)	Classification, C
Green nylon carpet without integral backing.....	1 19½	5.28	105
Orange-brown nylon carpet without integral backing.....	1 19½	3.92	140
Blue nylon carpet with integral black foam rubber backing.....	1 19½	2.00	275

<sup>1</sup> Full available sample length beyond end of standard 4½-foot test flame.

Figures 4, 5, and 6 illustrate the appearance of the samples tabulated in Table IV after test exposure in the tunnel.

The smoke generation measurements indicated classification values of 87 and 67 on the green and orange-brown carpet samples, which did not have the integral black foam rubber backing. The blue carpet sample with the integral backing developed a smoke classification value of 352 after 4 min. of the standard 10 min. fire exposure period had elapsed.

Due to the rapid development of temperature in the tunnel furnace and the exhaust duct, the test on the blue nylon carpet sample was terminated after 4 min.

## SUMMARY

In the modified methenamine pill test, flaming did not propagate over the nylon carpeting tested. All materials evaluated by this test provided measurements well within the acceptance criterion of the proposed standard and would be classified as "resistant to flammability," as defined by the standard.

The chamber test results were similar to the performance of several commercial-grade nylon carpets tested in previous studies with this apparatus, where the tendency for self-sustained flaming and the adverse influence on flame propagation when insulative backing materials are present, was marked. Of particular interest were the increase in intensity of burning after the igniting fire was shut off and the subsequent flame propagation over the full length of the test sample.

The tunnel testing again demonstrated an increase in flame spread produced when the insulative backing material was part of the test sample. All of the tunnel test flame spread classification results for the nylon carpeting tested, were in excess of the "Hill-Burton" limitation of 75 and were greater than 100 for red oak flooring. The presence of the combustible black foam rubber integral backing on one of the tunnel test samples caused a significant increase in smoke generation. Without backing, the carpet samples produced less smoke than red oak in the ten minute exposure. With backing, in four minutes, the carpet sample produced  $3\frac{1}{2}$  times as much smoke as that generated with red oak in a ten minute test. Some additional smoke would have developed had the test been continued.

In the modified methenamine pill tests, the small, short duration ignition source did not propagate flame over the surface of the carpets tested and the low ignition energy involved was not able to involve the foam rubber backing material, nor measure the adverse influence of the backing with respect to the reduction of heat transfer to the substrate.

In the chamber and tunnel tests, under continuous flaming exposure, the nylon carpets ignited and propagated flame at a steady rate until a large area of the sample was involved and air temperatures were high enough to produce accelerated convective heat flow, resulting in conditions conducive to sudden and rapid flame spread. In both tests, the penetration of the carpeting by the test flame caused distortion, blistering and eventual cracking exposing the backing and producing large quantities of smoke.

## DESCRIPTION OF FIGURES

The remainder of this report is devoted to descriptive captions for each of six figures (Nos. 1 through 6) referenced in preceding text.

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FIG.



FIGURE 1.—Appearance of typical samples after exposure to modified methenamine pill test; top, left and right samples are green and orange-brown carpets without foam backing. Bottom, left and right samples are blue and orange-brown with foam backing.

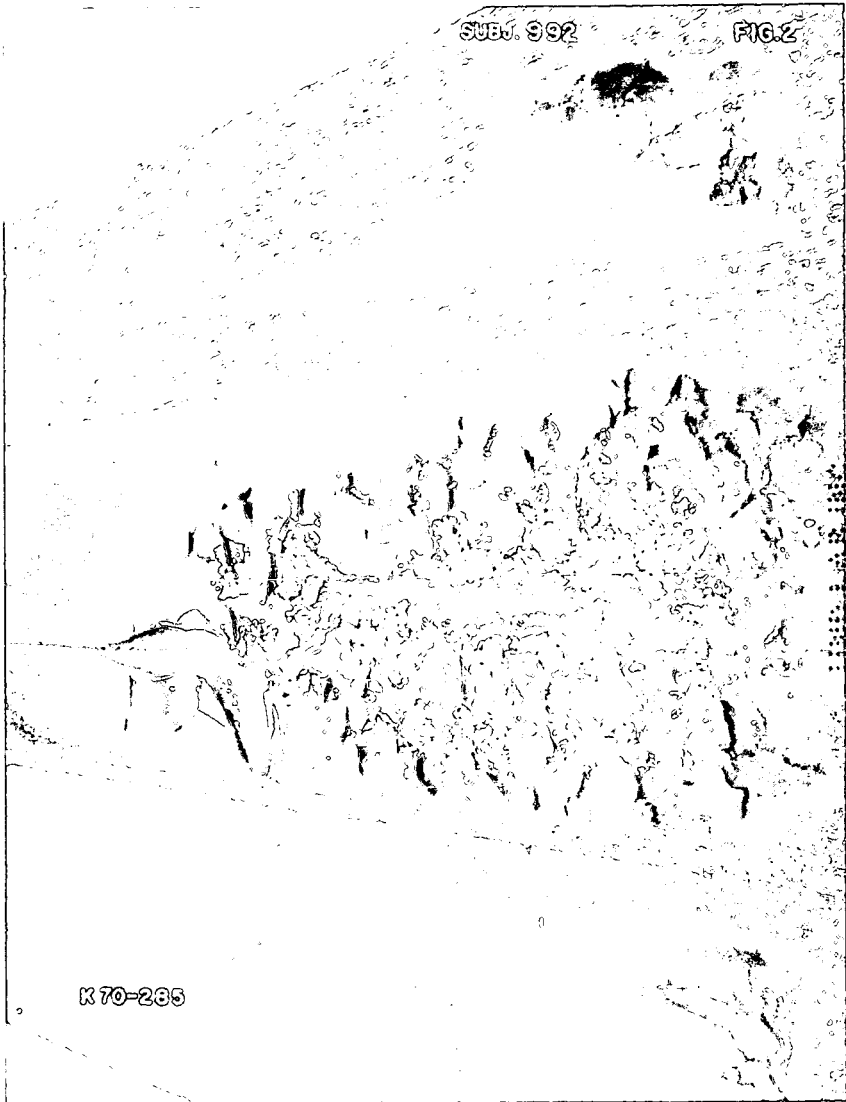


FIGURE 2.—Appearance of chamber test samples after exposure to a continuous flame ignition source; from top to bottom, green carpet without backing, blue carpet with backing, and orange-brown carpet without backing.

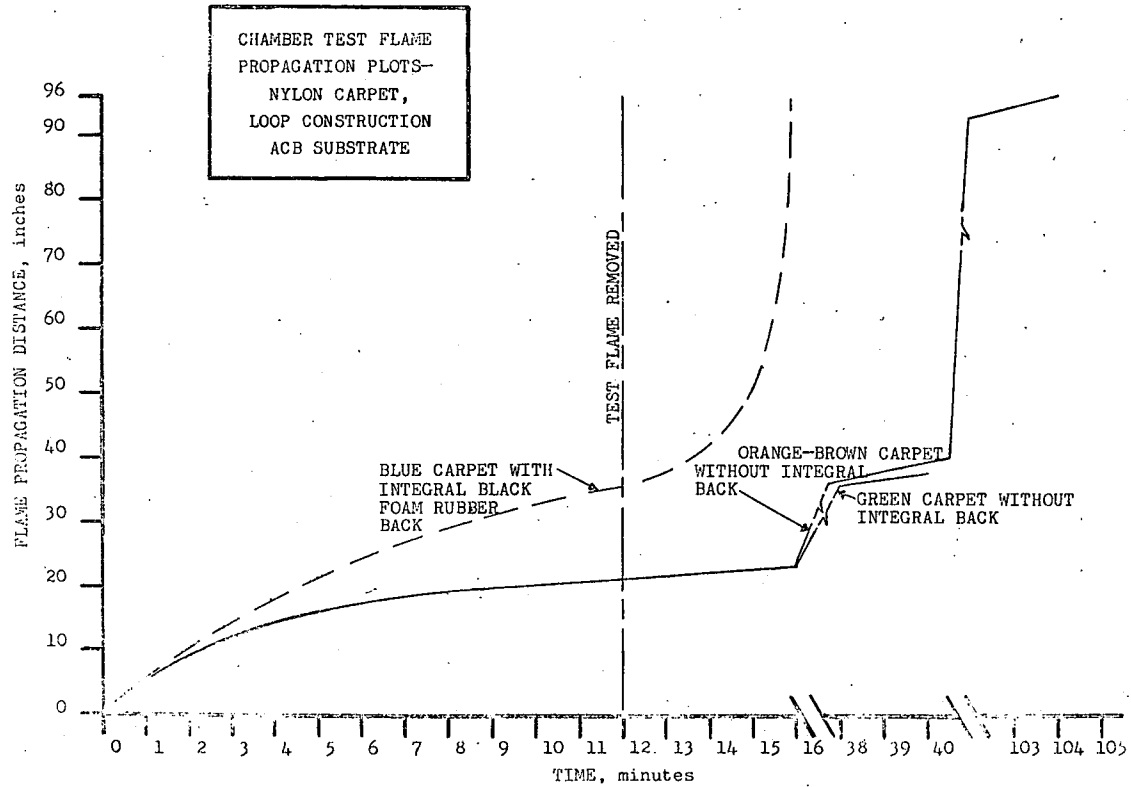


FIGURE 3.—Graphic representation of chamber test flame propagation observations with respect to time for each of three fire exposures on nylon carpet samples with and without integral backing.

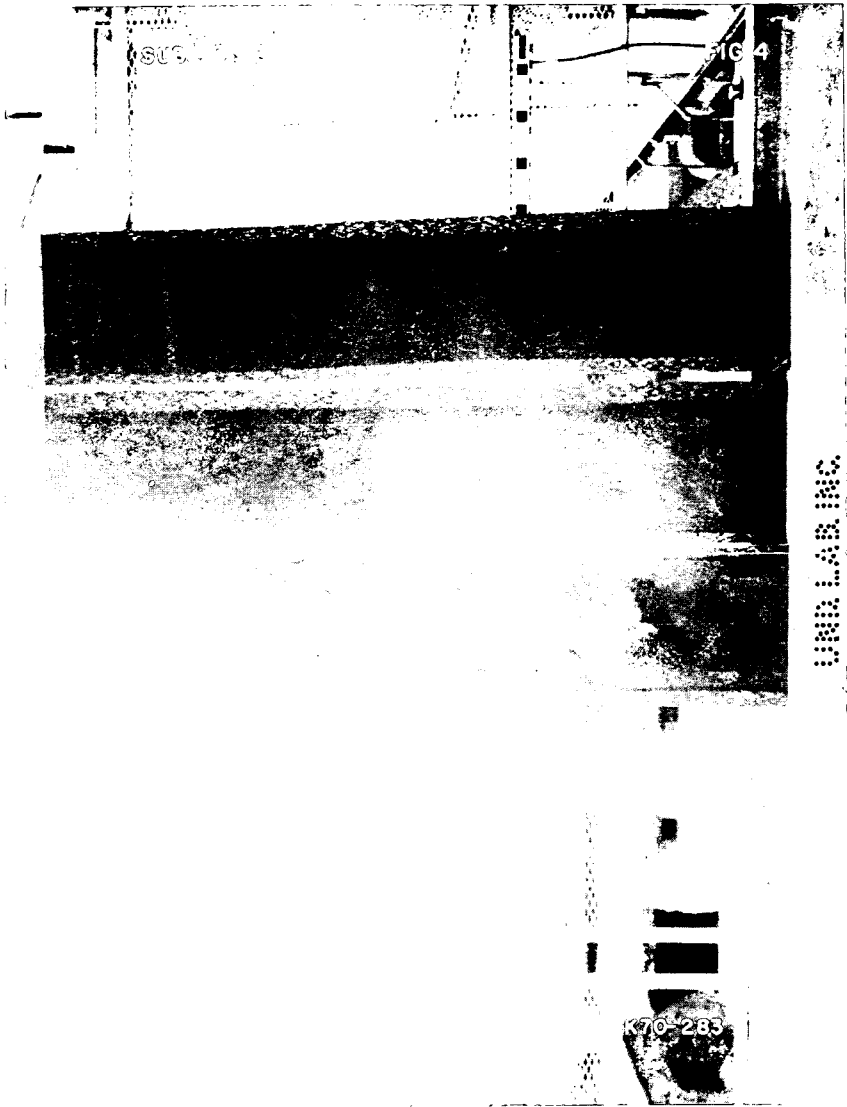


FIGURE 4.—Appearance of tunnel test sample after exposure to standard test flame; green nylon carpet, without integral backing, secured to nominal  $\frac{1}{4}$  in. asbestos-cement board with A. P. Green Refractory Cement. The three panels represent the 25 ft. sample, with the most damaged panel being the one exposed to the igniting fire.



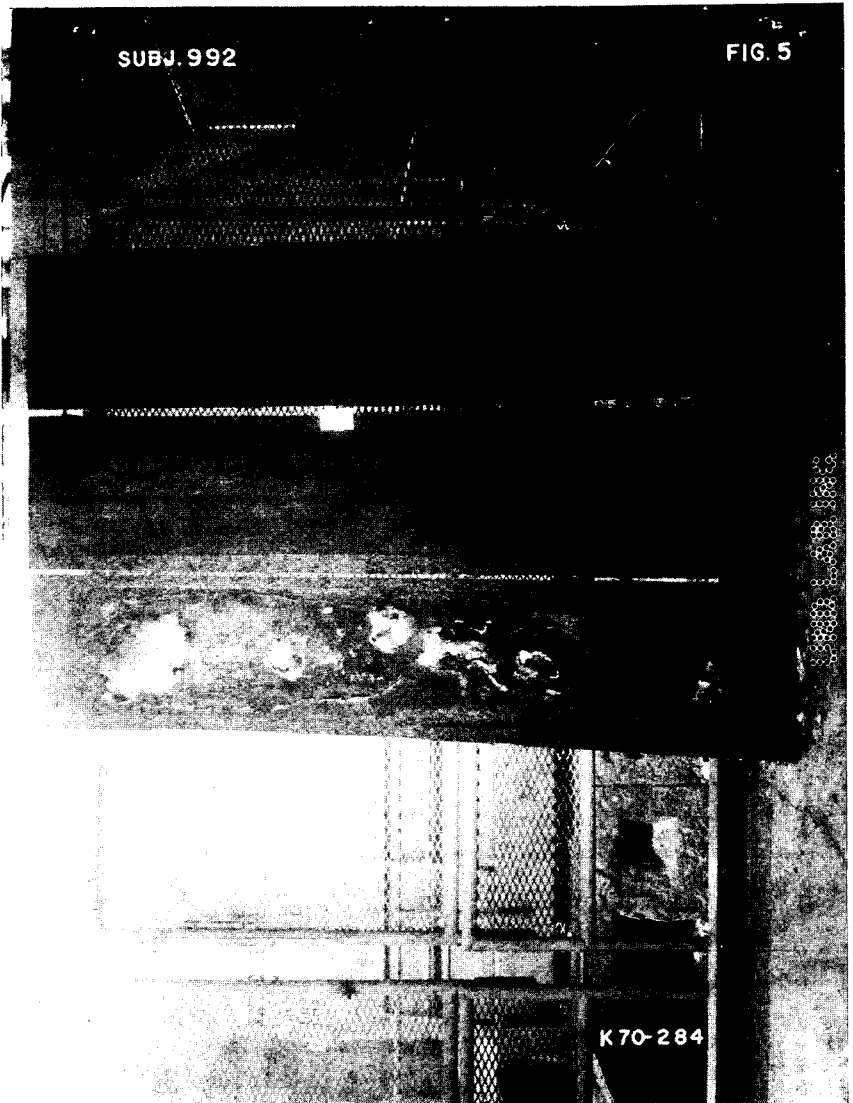


FIGURE 5.—Appearance of tunnel test sample after exposure to standard test flame; orange-brown nylon carpet, without integral backing, secured to nominal  $\frac{1}{4}$  in. asbestos-cement board with A. P. Green Refractory Cement.

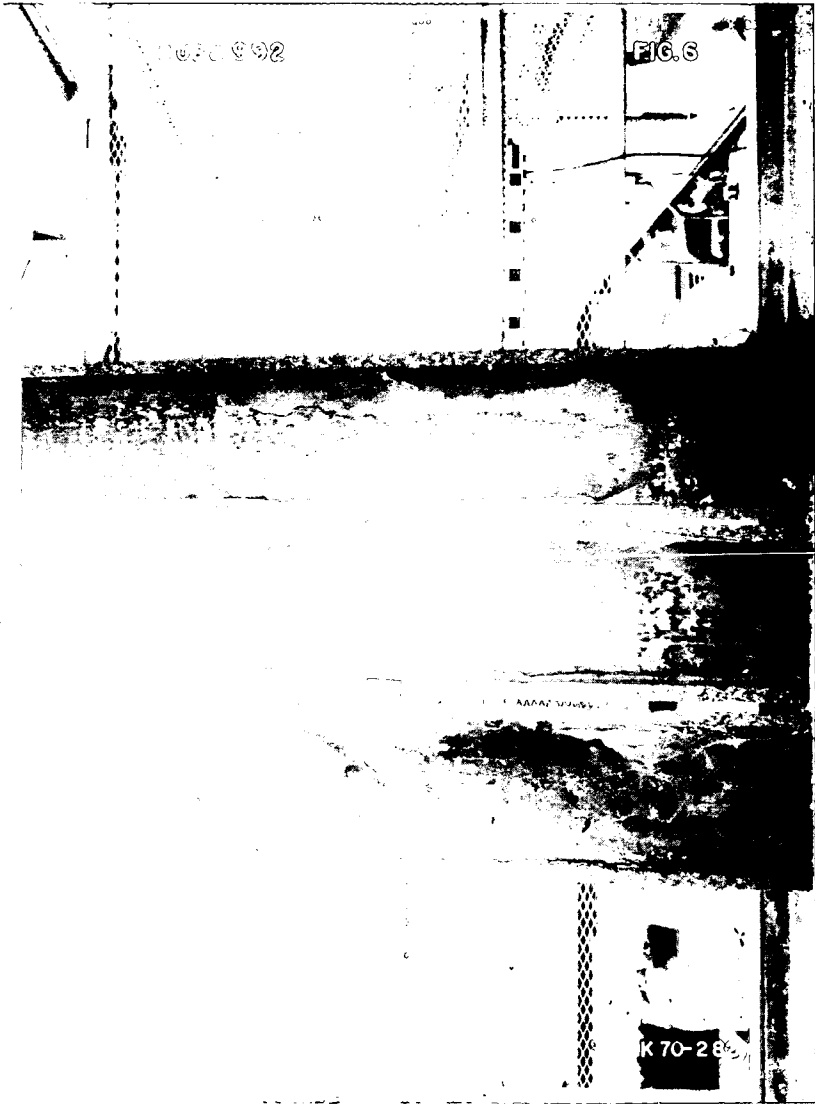


FIGURE 6.—Appearance of tunnel test sample after exposure to standard test flame; blue nylon carpet, with integral black foam rubber backing, secured to nominal  $\frac{1}{4}$  in. asbestos-cement board with A. P. Green Refractory Cement.

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