

MINUTES OF THE SENATE COMMITTEE ON LOCAL GOVERNMENT

The meeting was called to order by Senator Audrey Langworthy at _____
Chairperson

9:07 a.m./~~p.m.~~ on February 27, _____, 1992 in room 531-N of the Capitol.

All members were present except: Senator Gaines

Committee staff present: Theresa Kiernan, Revisor of Statutes
Mike Heim, Legislative Research
Elizabeth Carlson, Committee Secretary

Conferees appearing before the committee:

- Mike Selves, Emergency Preparedness
- Dr. Joe Eagleman, University of Kansas
- Larry Krudwig, National Weather Service, Kansas City Missouri
- Bill Niederhofer
- Randy Duncan, Cowley County Civil Defense
- Bob McDanel, Board of Emergency Medical Services
- Lt. Frank Goddard, Kansas Highway Patrol
- Richard J. Peckham, President, Mobile Manor, Inc., Andover, Ks.
- Clint Loder, Salina, Kansas

SB 586 - Storm shelters for mobile home parks

Senator Daniels said she had received information from several proponents who could not be here today and she passed out information concerning this bill. (Attachments 1,2,3,4,5,6,)

Mike Selves, Emergency Preparedness, read from a prepared statement. (Attachment 7) He appeared as a proponent of the bill. He gave several groups of statistics concerning wind velocity, and the damage which occurs at mobile homes tied down and also those which are either not tied down or not properly tied down. He said the mobile home park damages have increased dramatically.

Dr. Joe Eagleman, University of Kansas, appeared as a proponent of the bill. (Attachment 8) He stated shelters should be below ground, the basements need to be made of reinforced concrete, anything held together with mortar is poor. The people are not safe either under or in the mobile home, but should be in a shelter. Senator Petty asked where was the safest corner to be in case of a tornado, Dr. Eagleman replied the northeast corner in a basement.

Larry Krudwig, National Weather Service, Kansas City, Missouri, introduced several visitors who were with him. He stated just issuing warnings is not enough. There is value in the tie-down systems but for safety you should leave for a shelter when a warning is announced. There is not safety in a modular or mobile home. He gave some statistics of the deaths from tornadoes during 1985-1990. 32.6% resulted to those in a mobile home and 24.7% living in other homes. (Attachments 9,10,11)

Bill Niederhofer read from a letter written by his wife, Rosemary, concerning the tornado in Topeka on May 5, 1983. (Attachment 12)

Randy Duncan, Coordinator, Cowley County Civil Defense, said he supported SB 586. (Attachment 13) He said the residents of mobile home parks should be assured to know a shelter is available to them. Mobile homes fare poorly in high winds. He requested the committee to pass favorably on SB 586.

Unless specifically noted, the individual remarks recorded herein have not been transcribed verbatim. Individual remarks as reported herein have not been submitted to the individuals appearing before the committee for editing or corrections.

CONTINUATION SHEET

MINUTES OF THE SENATE COMMITTEE ON LOCAL GOVERNMENT,

room 531-N Statehouse, at 9:07 a.m./~~xxx~~ on Thursday, February 27, 1992

Bob McDanel, Board of Emergency Medical Services, said they are called on to provide assistance and education during disasters, and he used an analogy between using seat belts and shelters for mobile home parks.

Lt. Frank Goddard, Kansas Highway Patrol, appeared to support SB 586. He was a resident of a mobile home park in Andover, and he said the mobile home parks should have shelters and should be large enough to accomodate those living in the mobile home park. (Attachment 14)

Richard J. Peckham, President, Mobile Manor, Inc., Andover, Kansas appeared as an opponent of SB 586. (Attachment 15) In comparing HB 2936 and SB 586, he saw substantial differences and he urged the committee to adopt a mobile home park storm shelter provision applying only to new mobile home parks and requiring not more than 8 square feet of storm shelter space per mobile home. He said he owns several mobile home parks and they have storm shelters in all their parks, and they do require tie-downs. The mobile home park in Andover was in compliance with the tie-down law. The storm shelter was not an issue in the Andover storm. No one died who had taken shelter. 17 or 18 apartment complexes nearby had no shelter. The shelter was adequate and could have held 500 people. He said he would recommend 5-8 square feet per mobile home. He said emergency preparedness and education should be mandated.

Clint Loder, Salina, appeared in opposition to SB 586. (Attachment 16) He said he owns a small mobile home park and if he was forced to provide a storm shelter it would cost \$10,000 - \$12,000 and add a 40% raise in monthly rent. He said city and county governments do not have to supply public storm shelters, and he felt the mobile home parks were being discriminated against in SB 586.

The meeting adjourned at 10:00 a.m.

Date: Feb 27, 1992

GUEST REGISTER
 SENATE
 LOCAL GOVERNMENT

NAME	ORGANIZATION	ADDRESS
Joe Egleman	KANSAS UNIV.	DEPT. PHYSICS & ATM. SCI.
Ben Shen	NWS	601 E. 12th Street KC, MO 64106
KATHY HOXSIE	National Weather Service	601 E. 12th Street KC, MO 64106
RANDY MCKEE	"	1236 Mexico City Ave, KC MO 64153
ST. FRANK GODDARD	KANSAS HIGHWAY PATROL	WICHITA
Perry Scott	KAP	TOPEKA
MIKE SELVES	KS DIV. OF EMERG PREP	Box C-300 TOPEKA, KS 66601
Randell C. Duncan	Cowley County Civil Defense Kansas Emergency Preparedness Association	P.O. Box 736 Winfield, Ks. 67156-0736
MARVIN E. HENRY	K.O.E.P.	2800 S. TOPEKA, TOPEKA 66601
Anne Kuhn	Ka. Juvenile Advising	112 W 6th 66603
LAWRENCE J. KRUDWIG	NATIONAL WEATHER SERVICE	601 E 12TH ST. KANSAS CITY - MO 64106
DANA TETER	INTERIO-FRAHM	2303 Willow MANHATTAN
John Melvin	KMHA	2219 Edgemoor SALINA
Clint Loder	KMHA	P.O. Box 31 Brookville KS
JANET STUBBS	HBAK	TOPEKA
Jim Humphreys	KMHA	TOPEKA
Richard Rockham	MOBILE MANOR, Inc.	105 E. RHONDDA HANDOVER, KAN
Bob McDaniel	Board of EMS	109 SW 6TH, TOPEKA



THE CITY OF
HESSTON

P O L I C E D E P A R T M E N T

Hesston Municipal Building / 115 E. Smith / P.O. Box 100 / Hesston, KS 67062 / 316 327-4412

MICKEY H. DeHOOK
Director of Public Safety



Senator Norma Daniels
Chairman Senator Audrey Langsworthy
Members of the local government committee

On March 13, 1990 at 5:38 p.m. Hesston took a direct hit from one of the most powerful tornadoes reported in history. The tornado ripped through Hesston causing injuries to 16 residents and damaging 258 homes and businesses at a cost of over 22 million dollars.

I am writing this letter in total support of SB 586 because I feel that we have a responsibility to take whatever measures are necessary to protect people. I have seen the results of what a tornado can do, not only in Kansas but in Ohio. So often we overlook what the right thing is to do when we compare it with cost and pressures from special interest groups.

Historically and traditionally mobile home parks are a target of tornadoes. I feel everybody on this committee is well aware of that fact. Each and every one of you need to personally search out in your own heart and mind before voting against SB 586. Don't make the mistake of weighing the cost when lives may be at risk.

Thank you for the opportunity to voice my feeling on this matter. I know each and everyone of you are truly committed. Vote favorably for SB 586.

Sincerely,

Mickey H. DeHook
Chief/Director of Public Safety

MHD:ijb

*Attachment 1-1
Senate Local govt
Feb. 27, 1992*

Senator Daniels -

Year	Mobile Homes	Deaths Total	%Mobile Mobile Homes	Injuries Total	Mobile Homes %Mobile Damaged or Destroyed
1991	23	39	59.0%		600
1990	9	53	17.0%		700
1989	8	50	16.0%		400
1988	15	32	46.9%		1200
1987	25	59	42.4%	495	500
1986	9	15	60.0%		550
1985	28	94	29.8%		840
1984	43	122	35.2%	234	2488
1983	20	34	58.8%	230	746
1982	20	64	31.3%	308	1246
1981	14	24	58.3%	107	792
1980	11	28	39.3%	311	1158
1979	9	84	10.7%	130	3077
1978	15	53	28.3%	171	937
1977	7	43	16.3%		1215
1976	18	44	40.9%	369	1504
1975	13	60	21.7%	230	1504
Total	287	898	32.0%	2585	14277
					18.1%
					14114 (Approx.)

Attachment 2-7
 Severe Local Storm
 February 27, 1992

10.0 % of casualties in mobile homes die. 5.0% die in all other situations, including permanent housing, vehicles, outdoors, etc.

Data courtesy Brian Smith and Hugh Crowther of the National Severe Storms Forecast Center (NSSFC) Severe Local Storms (SELS) unit, Kansas City, MO. Mr. Smith suggests that you contact Fred Ostby, NSSFC Director, at (816) 426-3427 before using these data.

Others who have contributed information during the last 24 hours include-
 Ron Berger and Linda Kremkau--National Weather Service (NWS) Warning and Forecast Branch
 Preston Leftwich--NSSFC Techniques Development Unit
 Jim Purpura--NWS Forecast Office, Norman, OK, Warning Coordination Meteorologist
 William Bunting--NWS Forecast Office, Norman, OK, Meteorologist, formerly Warning and Preparedness Meteorologist for Oklahoma

I've included the Policy Statement of the American Meteorological Society (AMS) on Mobile Homes and Severe Windstorms, published in the April, 1980 Bulletin of the AMS.

Good luck--

Harold Brooks

National Oceanic and Atmospheric Administration (NOAA)/National Research Council Research Associate
 NOAA/Environmental Research Laboratories/National Severe Storms Laboratory Norman, OK

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Emergency Management Agency (FEMA). A uniform
national warning communication system is not on the
horizon: thus, initiation of effective communications
warning systems involves cooperative effort among
local offices of the National Weather Service (NWS),
private meteorologists, local police, fire, civilian defense
agencies, and radio and TV stations. A prepared and
concerned public can do much to promulgate such
efforts and to take necessary precautions when
tornado warnings are broadcast.

An effective warning system must be timely. Impor-

tant developments in this regard include: 1) new and
faster methods of data handling and forecast (warning)
dissemination, such as the NWS's Automation of
Field Operations and Services (AFOS) system, and
2) the direct and rapid delivery of tornado warnings to
users through NOAA Weather Radio (NWR). Future
progress in improved reliable warnings and their
dissemination will involve sustained research and
development activity, together with economic, sociolog-
ical, and political dedication to create improved
solutions.

Note that tie downs are discussed only as property protection, not
as life or injury protection.

policy statement of the American Meteorological Society on mobile homes and severe windstorms

As adopted by the Council on January 27, 1980

Mobile home living is becoming a way of life for a
significant proportion of the population of the United
States. Over ten million people permanently reside in
over four million mobile homes throughout the country.
Additionally, another one million mobile homes are
occupied on a part-time basis.

It is with grave concern that the American Me-
teorological Society observes that almost 100 000
mobile homes (~2% of all mobile homes) are damaged
each year by windstorms to the extent that insurance
claims are filed. Further, the flying debris produced by
unsecured mobile homes during windstorms often
inflicts damage to surrounding equipment and per-
manent buildings, thus compounding the problem.

Hurricanes and tornadoes are not the only wind-
storms that destroy mobile homes. Often strong,
short-lived gusty winds from severe thunderstorms or
"dry" thunderstorms cause major damage and destruc-
tion to mobile homes. Wind gusts from such storms are
frequently greater than the 60 mph damage threshold
for these structures. Such storms occur in all parts of the
country, but are especially numerous in the High
Plains and western states. Additionally, near scenic
foothills and mountain areas, severe downslope wind-
storms, lasting six hours or more, can batter structures
with wind gusts up to 120 mph. These windstorms often
affect areas in a 15-30 mile wide band for 100 miles

along a mountain range.

Death and destruction in the wake of tornadoes,
hurricanes, thunderstorm gusts, and downslope moun-
tain winds have prompted efforts to encourage owners
of large mobile home parks to construct shelters. Such
activity is considered essential for life-safety. Also,
efforts at the local level to develop regulations governing
tie-downs have proven effective as a property protection
measure in wind-prone areas.

Recommendations: The American Meteorological
Society urges mobile home residents to vacate their
dwellings and to go immediately to a designated storm
shelter when a severe weather warning for high winds
is in effect. The Society also suggests that adequate
shelters be constructed at large mobile home parks as a
precaution against personal injury and death. Local
civil defense officials have access to plans for such
shelters published by the Federal Emergency Manage-
ment Agency.

As a property protection measure, the Society urges
that mobile homes be properly anchored to the ground.
Information on proper mobile home tie-downs and
shelters may be obtained from government sources
through the nearest State Division of Emergency
Services (Civil Defense) or corporations specializing
in mobile home tie-down equipment and installation.

Attachment 2-2
Senate Social Govt
Feb 27, 1982

U.S. Total Fatalities

	Misc. Bldg.	Outside	Vehicle	Perm. home	Mobile	School	Comm. Bldg.	Auditorium	Other	Total
1990	1	1	14	25	7	5				53
1989			16	8	12	9	4		1	50
1988	2	0	3	6	21					32
1987		3	3	7	24			22		59
1986			3	3	7				2	15
1985			4	40	28				22	94
Total	3	4	43	89	99	14	4	22	25	303
	1.0%	1.3%	14.2%	29.4%	32.7%	4.6%	1.3%	7.3%	8.3%	100.0%

3-8
Attachment
Senate Social Dept.
February 27, 1992

Fatallties in Residence

	Permanent Residences			Total	Mobile	Total
	Single	Multiple	Unknown			
1990	17	8	0	25	7	32
1989	4	4	0	8	12	20
1988	4	0	2	6	21	27
1987	1	0	6	7	24	31
1986	2	1	0	3	7	10
1985	7	2	31	40	28	68
Total	35	15	39	89	99	188
	18.6%	8.0%	20.7%	47.3%	52.7%	100.0%

Senator Daniels-

From the 1980 Census, I was able to find information broken down by kind of housing unit, not by population within housing units. So, here it is--

	Millions of units	Percent of total
Single-family dwellings	57.2	65.9
Multiple-family dwellings	25.2	29.0
Mobile homes	4.4	5.1
Total	86.8	100.0

From the data I sent you earlier, 52.7% of fatalities within residences occur in mobile homes. For the sake of argument, let us assume that the number of residents per housing unit is the same for each dwelling type. To compare the chance of being killed in a mobile home with the chance of being killed in a multiple-family dwelling, I can make two approximations with the data about permanent-residence fatalities. The first is to assume that the fraction of total deaths in permanent housing that occur in multiple residences is the same in the category I labelled 'Unknown' as it is in the known category. If that is true, then a mobile home resident is 21.1 times more likely to be killed by a tornado than a multiple-family dwelling resident and 20.5 times more likely to be killed than a single-family dwelling resident.

The other assumption is that all of the 'Unknown' fatalities occurred in multiple-family residences. If that is true, then the mobile home dweller is 36.5 times more likely to be killed in a tornado than the single-family dwelling resident and 10.4 times more likely to be killed than a multiple-family dwelling resident.

On the basis of this limited data set (1985-1990 fatalities) and the assumptions above, I believe we can say with confidence that mobile home residents are at least 10 times as likely, perhaps more than 20 times as likely, to die in a tornado than apartment dwellers.

Harold E. Brooks, Ph.D.

National Oceanic and Atmospheric Administration (NOAA)/National Research Council
Research Associate

NOAA/Environmental Research Laboratories/National Severe Storms Laboratory

Norman, OK

*Attachment 3-4
Senate Local Govt.
February 27, 1992*

AM

62 Degrees



852 S Edgemoor - Wichita, Ks 67218 682-3654 FAX 682-9611

Thursday Feb 27, 1992

WICHITA AREA UPDATE Local TV News

KAKE-10

- Property owned by City Councilman Kamen won't have to be repaired until May. It was cited for violations of the City Building Code nearly six months. City officials say Kamen is not being given special treatment because he is their boss.
- The city may appeal the ruling of Judge Paul Clark that overturned the conviction of an abortion protestor based on the city's anti-loitering law.
- A computer Fingerprint database is proving helpful to Wichita police. It has been used to identify 100 suspects.
- Dust mites and mold may be the cause of allergies. Clean homes may help more than drugs.
- A Siberian Tiger undergoes cataract surgery at K-State University. The 3 month old tiger was bumping into things.

KWCH-12

- Coleman stock closed at over \$25 a share. More than 4 million shares were sold to the public today starting at \$19.50. CEO Larry Jones was pleased.
- An anti-abortion magazine says Operation Rescue protests last summer reduced abortions in Kansas from 1104 in Aug 1990 to 171 in Aug 1991. State Health Dept officials say the number of abortion returned to normal in Sept.
- Applicants for County jobs may have their criminal records checked following the arrest of a Tag Office employee for stealing \$6400. She had a record of convictions for writing bad checks. Treasurer Jerry McCoy will check the criminal records of all current employees.
- Some Halstead elementary school students may be bussed 8 miles to Bently schools to make the class sizes equal. Halstead has classes ranging from 25-30 while the same grades in Bently are about 10. Some parents are objecting.
- Wichita's "Best Night Club" is "The Cowboy" on East Kellogg. The "Best Zoo Animal" is the Zebra.

KSNW-3

- Heuston's Colonial House Restaurant will be rebuilt after the a fire destroyed the landmark.
- Boeing says it bought more than \$340 Million worth of goods and services in Kansas last year.
- The only grocery store in Buhler is reopened by new owners. It had been seized by a bank two weeks ago.
- A rabid dog is found in Valley Center. It is the first rabid dog in Sedg Co since 1970. The dog has been killed. Its owners are being treated for rabies infections.
- An abortion bill will be debated in the Ks House on Friday.

NATION-WORLD

No Money for Drugs

Day 2 of the Pan-American drug summit convenes today in San Antonio, Texas. Yesterday, President Bush vowed to "redouble" America's efforts to fight drugs, but Bush turned down Ecuador and Peru's requests for more money to go after drug producers.

NYC School Shootings

Bloodshed yesterday rocked a New York school. A 15-year-old faces murder charges after allegedly gunning down two youths at Brooklyn's Thomas Jefferson High School. Later, a distraught, 16-year-old friend of the victims attempted suicide, shooting himself in the head.

Greenhouse Findings

A new study finds chloro-fluoro-carbons, the chemicals that destroy the ozone layer, don't contribute much to another environmental problem, the "Greenhouse Effect", or global warming. The study has broad implications for the White House, which is trying to ban CFC's, but has done little to fight carbon dioxide, the main cause of global warming.

AIDS Hoax?

Texas state officials say they cannot verify claims that six students at a small high school are infected with the HIV virus. Meanwhile, the counselor at the school, Bogota High in Rivercrest, has reportedly turned in her resignation. The state health officials investigating the claims say that they found several cases of HIV-positive people under age 20 in the area, but could not verify who they were or if they actually attended the school. State officials say they will protect the confidentiality of the cases they have found.

Irish Tolerance

The Irish Supreme Court yesterday ruled that a 14-year-old rape victim can leave Ireland for an abortion. Abortion is illegal in Ireland and a lower court had forbidden the youth from going abroad to get one.

Free Computer Virus Fix

Many people are concerned about a computer virus named Michelangelo because it is supposed to activate March 6th, the artist's birthday.

It will then reformat your computer. Newsfax has an anti-virus program from the Norton Company that will detect and destroy the virus before it does it's bad thing.

You can get a copy of it by bringing a disc to our office at 852 S. Edgemoor between 2pm and 4pm or call 682-3654.

No charge.

Giddy Up - Go

Calumet Farm, the famed stable of eight Kentucky Derby winners, will be sold at auction next month, a federal bankruptcy judge ruled yesterday.

Wichita Weather
Temperature at Dawn 45
Almost Perfect
High 65 Lo 40

...and Mary Ann

Bob Hines, head of the Gilligan's Island Fan Club, says the 1960s sitcom about seven stranded castaways is not just a TV show, it's "American folklore." For that reason, the club is petitioning Hawaii Governor John Waihee to change the name of Maui to Gilligan's Island.

Hines feels the show "deserves to be immortalized."

But folks in the governor's office in Honolulu feel differently. Carolyn Tanaka, Waihee's news secretary, rates the chances of the Gilligan's Island Fan Club getting its wish to be "zero to below zero."

Afternoon Radar Locations

E. 21st - Woodlawn to Webb
N. River Blvd - Murdock to 13th

Gas Watch

Lincoln/Oliver 89.9 N/C

Office Notes

A friend got some vinegar in his ear, now he suffers from pickled hearing.

If you can Type, You can Learn Wordperfect This Saturday!
Intensive - Small - Hands On Class

\$59

Free Manual - Free Macro Disc

Sign Up Now

Wordperfect Training

*Attachment 3-3
Senate for all youth
February 27,
1992*

Senator Daniels -

Here is a quick breakdown of fatalities from 1985-1990 in two tables. The first is total U.S., while the second is fatalities that occurred in residences.

"Permanent home" in the top table indicates single family or multiple family dwellings. In the lower table, I've attempted to break those out by single or multiple family. Of the 89 permanent residence fatalities I could not find information on the nature of 39 of the them. (My guess is that more than half of them are single-family, based on my recollection of the 31 May 1985 outbreak, which encompasses 31 of the fatalities.)

In one of the annual tornado fatality summaries, it is stated that, according to the Census Bureau, 6% of US residents live in mobile homes. I am going to try to track down the fraction that live in single and multiple family dwellings. It should be interesting. (P)

I may be able to send you more information in the morning. I am at my desk by 7:15 AM, if you need to reach me (405) 366-0499.

Attachment 3-4
Senate local govt.
February 27, 1992.

Harold Brooks



DAN CALIENDO

EMERGENCY MEDICINE

16220 EAST CENTRAL
WICHITA, KS 67230
316 733-0516

February 26, 1992

Senator Norma Daniels
Kansas State Capitol
Topeka, Kansas

Re: Senate Bill 586

Dear Senator Daniels:

As per our phone conversation, I want to go on record as strongly supporting your Bill regarding storm shelters for mobil home parks.

I have asked our trauma team coordinator to contact you and provide specific data; but I can tell you that all of the deaths we saw from the April 26, 1991 tornado came from mobil homes. In fact I can't remember hearing of any deaths from tornados in our entire nation in recent years of persons who had taken shelter in an adequate shelter. (You might confirm this in your conversations with Dr. Lillibridge.)

While I understand some people will argue that government should not legislate how we conduct our lives; I do think the residents of mobil home parks should at least have the option of taking their families to an adequate shelter. There is no question that storm shelters save lives.

If I can provide any other assistance in this matter, don't hesitate to give me a call.

Yours truly,

D. Caliendo MD

*Attachment 4-1
Senate fiscal report
February 27, 1992*

Andover Police Department

909 N. Andover Rd.
Andover, Kansas 67002
(316) 733-5177

Thomas L. Mathes
Chief of Police

February 25, 1992

To: Senator Norma Daniels

Re: Senate Bill No. 586

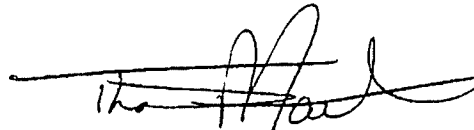
If the Golden Spur Mobile Home Park had not had a storm shelter, the deaths and injuries on April 26th, 1991, would have been greater. The fact that there was a shelter save many lives.

I believe that this bill is a good and necessary requirement for Mobile Home Parks. If there is any doubt, viewing the before and after tape of the mobile home park as it was on April 26th, 1991, would remove that doubt.

The only question I have is if 18 square feet of shelter space for each mobile is too much. Maybe 10 square feet would be sufficient as cited in bill #2936.

I hope that this will be of some assistance to you. If I can be of further assistance please feel free to contact me.

Sincerely,



Thomas Mathes
Chief of Police

Attachment 5-1
Senate local govt.
February 27, 1992



Cowley County Civil Defense

2701 East 9th

P. O. Box 736

Winfield, KS 67156

RANDALL C. DUNCAN
Coordinator

February 20, 1992

Honorable Senator Norma Daniels
State Office Building
Topeka, Kansas

Senator Daniels,

Attached, please find remarks on behalf of the Kansas
Emergency Preparedness Association (KEPA) which we would
request that you add to the hearing record for Senate Bill
No. 586.

We are pleased at the opportunity we have to support you on
the introduction of this important measure, which could have
a major impact on the safety of mobile home parks, as defined
in your proposed legislation.

Good luck in the hearings, and we hope for a favorable report
out from committee.

If we can be of further assistance on this matter, please
call.

Sincerely,

Randall C. Duncan, CEM
Certified Emergency Manager
Coordinator
Cowley County Civil Defense

RCD:me

enc: Remarks

cc: Kansas Division of Emergency Preparedness

Post-It™ brand fax transmittal memo 7671 # of pages > 1

To	Sen. Norma Daniels	From	Randall C. Duncan
Co.	State Office Bldg.	Co.	Cowley County Civil Defense
Dept.		Phone #	(316) 221-0471
Fax #	(913) 296-0103	Fax #	(316) 221-1071

Attachment 6-1
Senate local govt.
February 27, 1992

KANSAS EMERGENCY
PREPAREDNESS ASSOCIATION
AN ASSOCIATION OF LOCAL EMERGENCY PREPAREDNESS ORGANIZATIONS

Remarks on Senate Bill Number 586

By Randall C. Duncan, CEM

Coordinator, Cowley County Civil Defense

Representing the

Kansas Emergency Preparedness Association

To the Honorable Committee Chair, Senator Audrey Langworthy

It is the pleasure of the Kansas Emergency Preparedness Association (KEPA) -- which represents the local emergency management/civil defense coordinators in 54 counties across the state -- to offer the following remarks to be entered into the hearing record for the hearing on Senate Bill No. 586.

We fully support Senate Bill No. 586 by Senator Norma Danie as introduced. We believe it provides for the safety and welfare of Kansas Citizens who choose to reside in mobile home parks. After the experience of the residents of the Golden Spur Mobile Home Park in Andover, we believe that all parks, as defined by SB 586, should be equipped with proper ventilated shelters with the appropriate room for residents. We believe that these shelters should be accessible to and useable by handicapped persons. We further believe that these shelters need to be accessible 24 hours a day.

These shelters can provide the necessary element of additional safety to enhance the prospects of living within mobile home park. The residents of a park should be greatly reassured to know that a shelter is immediately available to them which is conveniently or centrally located within their area. This additional safety factor added to mobile home parks may result in an increasing demand for manufactured housing.

Dr. Scott Lillibridge, M.D., in his capacity as a physician with the Epidemic Intelligence Service Center for Environmental Health and Injury Control at the Centers for Disease Control, Atlanta, Georgia, has made an extensive study of the fatalities and survivors in Andover, Kansas. He said to me in a telephone call on Wednesday, February 19, 1992 that it was interesting to note in the case of the Golden Spur Mobile Home Park the differences between the park itself and the single-family site-built dwellings adjacent.

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PREPARE TODAY - ALIVE TOMORROW

Attachment b2
Senate local govt.
February 27, 1992.

The fatalities and serious injuries were confined to the area, and the single-family site-built dwellings next door experienced little injury and no fatalities. Dr. Lillibr informs me he plans to release results from his study in Wichita on Thursday, March 26, 1992.

His comments are further supported, however by previous research into tornado injuries and fatalities. A study entitled "Injuries from the Wichita Falls Tornado: Implications for Prevention," by Roger I. Glass, Robert B. Craven, Dennis J. Bregman, Barbara J. Stoll, Neil Horowitz, Peter Kerndt and Joe Winkle as published in the 15 February 1980 SCIENCE journal, page 737, states in part...

"Mobile homes fare poorly in severe straight-line windstorms and tornadoes. Proper tiedowns that anchor the trailer are effective when wind speeds do not exceed 50 miles per hour but cannot protect a mobile home in greater winds or from direct tornado hit. The high rate of injury we observed, despite the small number of cases and the nonrandom sample is consistent with previous observations and research."

The recommendations section of this same study also states "People in single-family homes in a tornado-prone area should identify and reinforce some interior portion of the home as a shelter. Mobile-home parks should provide community shelters for their residents..."

Another study, entitled "Risk Factors for Tornado Injuries," by Millicent Eidson, Jeffrey A. Lybarger, John E. Parsons, N. MacCormack and John I. Freeman as published in the International Journal of Epidemiology (Vol 19, No. 4) deals with the tornadoes in North and South Carolina on 28 March, 1984. The study states, "People living in mobile homes were more likely to be hospitalized or die than people occupying conventional houses (page 1051)."

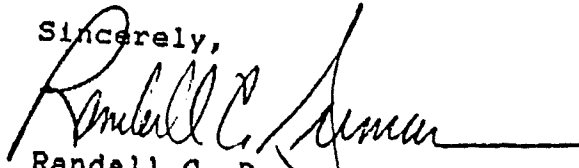
The study also further states, "The results of our study also increase the concern about the risk of mobile homes, and offers support for previous advisories for mobile home residents to leave their homes and for requiring regulations for tie-downs and safer shelters to be provided in mobile home parks."

For these reasons, and more, the members of the Kansas Emergency Preparedness Association-- representing local civil defense/emergency management coordinators/directors in 54 counties in Kansas -- request the committee to consider reporting favorably on SB 586.

Attachment 6-3
Senate local govt.
February 27, 1992

Thank you for your consideration in this matter. Should further information or amplification of statements or information be deemed necessary, we will be happy to provide whatever is requested.

Sincerely,



Randall C. Duncan, C.E.M.
Certified Emergency Manager
Coordinator
Cowley County Civil Defense
2701 East 9th Street
Winfield, Kansas 67156
(316) 221-0470
FAX (316) 221-1074

Legislative Information Chair
Kansas Emergency Preparedness Association

RCD: me

cc: Kansas Division of Emergency Preparedness

Attachment 6-4
Senate local govt.
February 27, 1992

STATE OF KANSAS
THE ADJUTANT GENERAL
DIVISION OF EMERGENCY PREPAREDNESS
P.O. BOX C-300
TOPEKA, KANSAS 66601-0300

IN 1972, IOWA STATE UNIVERSITY PRODUCED A STUDY CONCERNING MOBILE HOMES AND THE EFFECTS OF WIND UPON THEM. THIS STUDY WAS WRITTEN BY DONALD I. MCKEOWN, AIA ASSOCIATE PROFESSOR OF ARCHITECTURE, AND, BY FRANK H. BRITTAN, PH.D., ASSISTANT PROFESSOR OF ENGINEERING MECHANICS. EVERY STUDY CONDUCTED SINCE 1972 HAS CONFIRMED AND REINFORCED THE WORK OF IOWA STATE UNIVERSITY.

ALTHOUGH THE ENTIRE MANUAL IS MOST INTERESTING, ONLY A FEW OF THE MORE RELEVANT FINDINGS WILL BE USED HERE.

THE FIRST REFERENCE OF INTEREST CONCERNS THE WIND SPEED AT WHICH DAMAGE BEGINS OCCURRING TO THE UN-RESTRAINED MOBILE HOME. THE REPORT SHOWS CLEARLY THAT A 45 M.P.H. WIND THAT RAPIDLY WHIPS AROUND (NOT UNCOMMON IN A NORMAL THUNDERSTORM), CAN CAUSE SEPARATION AT THE ROOF/WALL JOINT. WHEN SEPARATION OCCURS UNDER THESE CONDITIONS THE MOBILE HOME WILL TO VARYING DEGREE DISINTEGRATE NOT ONLY DESTROYING THAT MOBILE HOME BUT SETTING THE STAGE FOR DISINTEGRATION OF MOBILE HOMES DOWNSTREAM THAT ARE DAMAGED BY DEBRIS.

THE SECOND REFERENCE OF INTEREST CONCERNS THE WIND SPEED NECESSARY TO OVERTURN AN UNSECURED MOBILE HOME. THE REPORT SHOWS CLEARLY THAT A WIND OF 60 M.P.H. (SOMETIMES LESS) WILL OVERTURN A MOBILE HOME AND THAT TOTAL DESTRUCTION OCCURS IN THE PROCESS. AGAIN, DEBRIS BLOWING DOWNSTREAM WILL START THE CHAIN REACTION TOWARDS DESTRUCTION OF OTHER MOBILE HOMES SECURED OR NOT.

OF INTEREST HERE IS THE WIND SPEEDS OF VARIOUS TYPES OF STORMS. IT IS NOT UNUSUAL FOR A LESS THAN SEVERE THUNDERSTORM TO PRODUCE BRIEF WINDS OF 40 TO 80 M.P.H. IN 1972, THE ESTIMATED RANGE OF WIND SPEED IN A TORNADO WAS BETWEEN 100 AND 500 M.P.H. IN RECENT YEARS, AS WIND GAUGES HAVE BECOME BETTER AT SURVIVING TORNADIC WINDS, THOSE WIND SPEED ESTIMATES OF 1972 HAVE BEEN SOMEWHAT REVISED BUT NOT ON THE DOWN SIDE.

ENGINEERING TECHNIQUES AND WIND TUNNEL TESTS IN 1972 SHOW THAT THE MOBILE HOME REACTS IN A SPECIAL MANNER WHEN SUBJECTED TO WINDS OF HIGH INTENSITY BECAUSE:

1. IT HAS A UNIQUE SHAPE NOT NORMALLY SEEN IN OTHER STRUCTURES.
2. IT IS GENERALLY LONG AND NARROW.
3. IT IS MUCH LIGHTER IN WEIGHT THAN CONVENTIONAL STRUCTURES.

*Attachment 7-1
Senate Social gourt
Feb 27, 1992*

4. IT GENERALLY HAS OPEN SPACE BETWEEN THE GROUND AND THE FLOOR FRAMING.

UNDER THE PROPER ANCHORING CONDITIONS IT IS SAFE TO SAY THAT MOST MOBILE HOMES COULD RESIST WINDS IN THE 100-125 M.P.H. CATEGORY WITHOUT DISINTEGRATING. WINDS OF HIGHER MAGNITUDE WOULD BE IN THE CATEGORY OF TORNADIC WINDS WHICH WOULD CAUSE DAMAGE, INCLUDING DISINTEGRATION.

DURING WIND TUNNEL TESTS, WIND LOADING OF MOBILE HOME SIDE WALLS HAS SHOWN THAT A 125 M.P.H. WIND WILL PRODUCE A FORCE OF ABOUT 35 POUNDS PER SQUARE FOOT.

A WIND VELOCITY OF 200 M.P.H., WHICH IS ON THE LOW SIDE OF TORNADIC WIND SPEEDS, WILL PRODUCE A FORCE OF 175 POUNDS PER SQUARE FOOT. A WIND SPEED OF 400 M.P.H. (NOT UNUSUAL IN A TORNADO), WILL PRODUCE A FORCE OF 650 POUNDS PER SQUARE FOOT.

FROM MOST SURVEYS OF DAMAGE CAUSED BY VIOLENT WINDSTORMS, IT HAS BEEN GENERALLY SHOWN THAT STRUCTURAL FAILURES RESULT FROM THE INABILITY OF THE MOBILE HOME TO ACT AS A UNIT. BASICALLY, BUILDINGS SECURELY TIED TOGETHER FROM GROUND ANCHOR THROUGH ROOF STRUCTURE ARE CAPABLE OF WITHSTANDING CONSIDERABLE PUNISHMENT. THIS APPLIES TO MOST CONVENTIONAL HOMES WHERE THE ENTIRE STRUCTURE WHICH IS TIED TOGETHER FUNCTIONS AS A STRONG UNIT RESISTANT TO ALL BUT THE HIGHER CATEGORY WINDS.

THE ANCHOR SYSTEM FOR MOBILE HOMES MUST GO UP THE WALL, OVER THE ROOF AND ANCHOR ON THE OPPOSITE SIDE TO ANOTHER GROUND ANCHOR IN ORDER TO GET UNIFIED ACTION.

IN VIRTUALLY EVERY CASE WHERE MOBILE HOMES HAVE BEEN DAMAGED OR DESTROYED IN THE PAST 17 YEARS, CLEAR EVIDENCE EXISTS SHOWING THAT:

1. EITHER THE MOBILE HOMES WERE NOT TIED DOWN, OR;
2. THAT THE MOBILE HOMES WERE NOT PROPERLY TIED DOWN.

WE FIND SUCH THINGS AS FARM IMPLEMENT SPRINGS SCREWED INTO THE GROUND AND BAILING TWINE, OR WIRE TIED TO THE TRAILER FRAME AND SPRING. MOSTLY THOUGH, WE FIND THESE DAYS NO EVIDENCE OF ANY EFFORT TO TIE DOWN MOBILE HOMES.

IT IS IMPORTANT TO SAY HERE THAT FROM A WIND SPEED OF 125 M.P.H. AND UP, EVEN CONVENTIONAL BUILT HOMES WILL RECEIVE STRUCTURAL DAMAGE RANGING FROM LIGHT TO TOTAL DISINTEGRATION.

THESE FIGURES SHOULD CLEARLY SHOW THE NEED FOR ENFORCEABLE TIE-DOWN STATUTES AND ALSO THE NEED FOR SHELTERS IN MOBILE HOME PARKS.

*Attachment 7-2
Senate Local Govt
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IN 1975, THIS AGENCY SUPPORTED A SIMILAR PIECE OF LEGISLATION. WHILE THE SHELTER REQUIREMENT WAS NOT ACTED UPON, THE TIE-DOWN REQUIREMENT WAS PASSED. THERE WAS NO PROVISION MADE FOR ENFORCEMENT AND INDEED TO THIS DAY, NO STATE AGENCY, DEPARTMENT, OR DIVISION HAS BEEN IDENTIFIED AS THE LEAD AND NO FUNDING FOR THIS PURPOSE HAS EVER TO OUR KNOWLEDGE EVEN BEEN DISCUSSED.

IN CLOSING I MUST SAY THAT IN THE 17 YEARS OR SO SINCE THE LEGISLATURE TOOK A LIMITED ACTION, THE MOBILE HOME PARK DAMAGES FROM STRAIGHT HIGH VELOCITY WINDS AS WELL AS TORNADIC WINDS HAVE INCREASED DRAMATICALLY. THERE ARE MORE EXISTING PARKS. THEY ARE LARGER. THE DEATH AND INJURY RATE OF MOBILE HOME OCCUPANTS FAR EXCEED THOSE FOUND IN CONVENTIONAL STRUCTURES.

MADAM CHAIRPERSON, OUR OFFICE STANDS IN SUPPORT OF THIS LEGISLATION.

THANK YOU.

MH:ea

*Attachment 7-3
Senate Local govt
Feb 27, 1992*

Testimony for Kansas Senate Bill No. 586 Mobile Home Parks Relating to Storm Shelters

Joe R. Eagleman
Professor of Atmospheric Science
University of Kansas

I would like to support Senate Bill No. 586. Since my first research on tornado safety factors in 1966 (Reference 1) I have tried to promote the need for storm shelters in mobile home parks. It is not uncommon for my students in Atmospheric Science to ask "why do mobile home parks attract tornadoes"? The answer is that they only seem to attract tornadoes because the damage is so much greater to mobile homes than to houses. Figure 1 shows the floor base of a mobile home and parts of a wall following a tornado which I investigated concerning safest locations in houses (Reference 2).

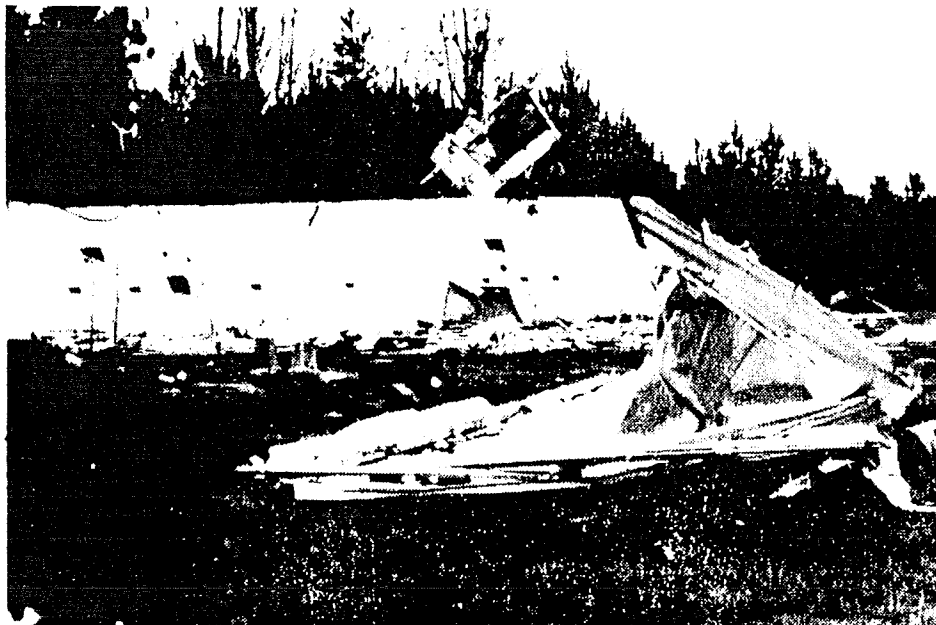


Figure 1. Example of a mobile home destroyed by a tornado.

The graph in Figure 2 summarizes my research on safest locations in houses. It shows a strong relationship between location in houses and safety. Basements and the first floor of houses without basements were safest in the northeast sections.

Basements with wood floors over them were about twice as safe as locations on the first floor.

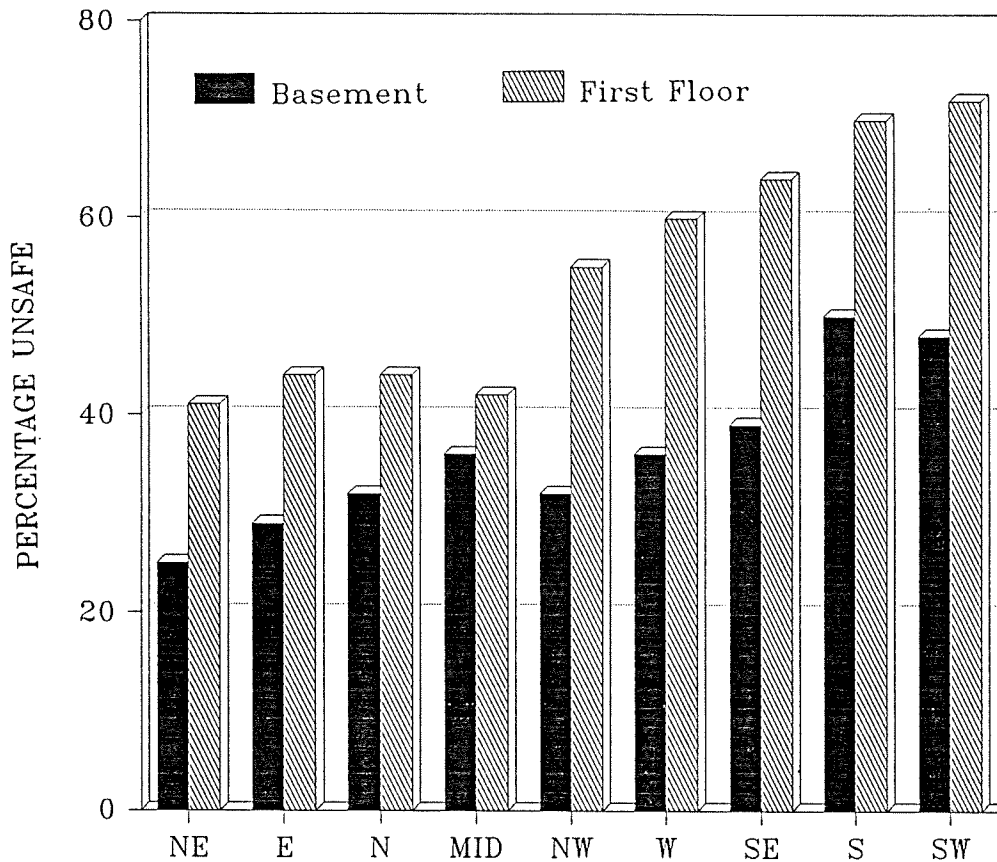


Figure 2. Unsafe locations in houses and basements.

My research shows that shelters below ground level are safer than above. It also showed that reinforced concrete basements generally survived a tornado with the wood floor above attached, if it was properly connected with bolts set in the concrete. Basements constructed of concrete blocks, stones or brick were not suitable shelters compared to reinforced concrete. Storm shelters constructed of reinforced concrete with a reinforced concrete ceiling would be a preferable construction. Such shelters could be used as recreational facilities with fold-up table-tennis, etc. This would allow residents, especially children to become accustomed to going to the shelter before and during stormy weather.

Senate Bill No. 586 would be extremely beneficial to mobile home residents. After investigating tornado damaged cities in many different states, including Kansas, it has been obvious to me that residents of mobile homes are extremely vulnerable to tornadoes because there is no place in or under a mobile home which offers adequate shelter from tornadoes even when tie-down equipment has been installed. Many mobile home residents do not have the time after warnings to get to a more

remote shelter outside the park. The majority are not likely to have other suitable shelter. The sensible solution to the extreme threat of tornadoes in mobile home parks is to require a centrally located storm shelter for all residents as proposed by Senate Bill No. 586.

References

1. Eagleman, Joe R., "Tornado Damage Patterns in Topeka, Kansas, June 8, 1966", Monthly Weather Review, Vol. 95, No. 6, 1967, 370-374.
2. Eagleman, Joe R., Severe and Unusual Weather, Trimedia Publishing Co, 1990, 394.

Attachment 8-3
Senate Local govt
Feb 27, 1992

policy statement

Mobile Homes and Severe Windstorms

A Policy Statement of the American Meteorological Society
as adopted by the Council on 13 January 1991

Mobile-home living is a way of life for a significant portion of the population of the United States. An estimated 13 to 15 million people permanently reside in an estimated 6 to 8 million mobile homes throughout the country. Additionally, another 1.7 million homes are occupied on a part-time basis.

It is of grave concern that the American Meteorological Society observes that tens of thousands of mobile homes (also known as manufactured homes) are damaged each year by windstorms to the extent that insurance claims are filed. Further, the flying debris produced by mobile homes during windstorms often inflicts damage to surrounding property, thus compounding the problem. Injuries and fatalities from high wind events also occur in a disproportionately high number to individuals occupying mobile homes. For example, statistics kept by the National Severe Storms Forecast Center for the 5-year period from 1985-89, show 37% of the tornado fatalities are persons who are either in or fleeing from a mobile home residence.

Hurricanes and tornadoes are sometimes perceived by the general public as the only weather events that cause major destruction to mobile homes. However, this perception is clearly false since many weather events are capable of producing surface winds that exceed the 31 m s^{-1} (70 mph) damage threshold for mobile homes. In particular, straight-line winds from thunderstorm outflows often produce areas of (tornado-like) damage to mobile homes. The spatial and temporal scales of these damaging outflow events are quite variable, ranging from "mesoscale convective systems" that may produce continuous or intermittent swathes of wind damage over several states, to short-lived convective outflows called "microbursts" that may only last 2-5 minutes and affect a path length less than 4 km (2.5 miles). Current research suggests that microbursts can occur throughout the country and are sometimes found in association with innocuous appearing cumulus clouds without heavy rainfall reaching the ground or the thunder, lightning, and hail often associated with high wind events.

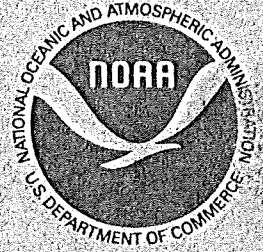
Wintertime frontal and cyclone systems, particularly near coastal regions, can also have wind speeds that exceed the wind damage threshold. These frontal

and cyclone events can affect large portions of a state or many states for time periods of several hours or greater. In addition, near foothills and mountain areas, severe downslope winds lasting 6 hours or more can batter structures with wind gusts up to 55 m s^{-1} (120 mph). These windstorms often affect areas as large as a 25-30-km (15-20-mile) wide band for 160 480 km (several hundred miles) along a mountain range.

Death, injury, and property damage in the wake of severe windstorms have prompted efforts to encourage owners of large mobile home parks to construct storm shelters. Such activity is considered essential for individual safety. Also, efforts at the local level to develop regulations governing tie-downs have proven effective as a property-protection measure in wind-prone areas.

Recommendations: As a property-protection measure, the American Meteorological Society urges that mobile homes be anchored properly to the ground. The Society also urges mobile home residents to become familiar with procedures to follow in the event of severe weather, since injuries can occur in severe wind events even when proper tie-down procedures are used.

Residents must be prepared to evacuate their dwelling and seek a safer location in the event of a tornado or high wind warning. The Society suggests that adequate shelters be constructed at mobile home parks as a precaution against injury and death. Information on proper tie-downs and shelters may be obtained from governmental sources through the nearest office of the State Division of Emergency Services (Civil Defense), or from corporations specializing in mobile home tie-down equipment and installation. Appropriate government agencies are urged to distribute relevant information periodically, such as procedures to follow in the event of severe weather and information on the construction of tie-downs and shelters, to residents of mobile homes. Since mobile home residents face a unique threat during high wind events, warning sirens or some other local notification system would prove useful to alert residents of impending wind danger. Residents in wind prone areas may also wish to purchase a National Oceanic and Atmospheric Administration (NOAA) weather radio.



TORNADO SAFETY IN RESIDENCES

A Slide Presentation With Commentary

Prepared For
Disaster Preparedness Staff
National Weather Service

By:
Prof. James J. Abernethy, AIA
Lawrence Institute of Technology
Southfield, Michigan

U.S. Department of Commerce / National Oceanic and Atmospheric Administration

*Attachment 10-1
Senate local govt.
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EAST WALL OF THE DEN, AWAY FROM THE EXPECTED WIND-BLOWN MISSILES.

102 A DOUBLE DOOR IS PROVIDED. THE HINGED DOOR IS A NORMAL INTERIOR RESIDENTIAL WOOD DOOR. BEHIND IT IS A STEEL-CLAD SLIDING PLYWOOD CORE DOOR THAT CAN BE CLOSED IN THE EVENT OF A TORNADO.

103 MOBILE HOMES AND LIGHT-WEIGHT MODULAR RESIDENCES ARE THE SELECTION OF LARGE SEGMENTS OF YOUNG ADULTS AND SENIOR CITIZENS. UNFORTUNATELY, THESE DWELLINGS ARE OFTEN THE SITE OF EXTENSIVE TORNADO-CAUSED DAMAGE. SEVERE THUNDERSTORMS WITH WINDS IN EXCESS OF 50 MPH CAN CAUSE DAMAGE TO UNANCHORED MOBILE HOMES.

EVACUATION IS A MUST!

104 TORNADOES CAN DISINTEGRATE MOBILE HOMES. THESE LIGHT-WEIGHT STRUCTURES ARE DISPLACED FROM THEIR FOUNDATIONS AND ARE FREQUENTLY SEPARATED FROM THEIR UNDERBODY FRAMES. IT IS FRUITLESS TO DISCUSS THE SEARCH FOR THE SAFEST LOCATION WITHIN A LIGHTWEIGHT MODULAR OR MOBILE HOME. THERE ISN'T ANY!

105 DEBRIS FROM ONE MOBILE HOME FREQUENTLY IMPACTS AGAINST THE WALLS OF ANOTHER CAUSING FAILURE OF THE SECOND UNIT. TIE-DOWNS WOULD REDUCE BUT NOT ELIMINATE THIS PROBLEM.

106 ALMOST CERTAIN MAJOR DAMAGE TO MOBILE HOMES OCCUR DURING A DIRECT HIT BY A TORNADO. THE STRONG STRAIGHT-LINE WINDS OF SOME THUNDERSTORMS HAVE ALSO PUSHED SUCH HOUSING FROM ITS FOUNDATION, CAUSING TIPPING OR OVERTURNING.

*Attachment 10-2
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107 AS A RESULT, TIE-DOWNS ARE REQUIRED IN MANY STATES. WHEN PROPERLY INSTALLED, THEY IMPROVE THE RESISTANCE OF THE HIGHLY VULNERABLE RESIDENCES TO HIGH WINDS. ANY CLAIMS OR BELIEFS THAT TIE-DOWNS GUARANTEE SAFETY IN A TORNADO ARE FALSE.

108 WHEN WARNED OF AN APPROACHING TORNADO, THE OCCUPANT SHOULD SEEK SHELTER IN A SAFE PLACE. SOME MOBILE HOME PARK OWNERS PROVIDE COMMUNITY FACILITIES WHICH ARE BUILT AS EFFECTIVE TORNADO SHELTERS.

IT IS WISE TO OCCUPY SUCH A SHELTER WELL IN ADVANCE OF A TORNADO. THE COMMUNITY BUILDING MAY BE SOMEWHAT DISTANT FROM THE MOBILE HOME SITE AND DIFFICULT TO REACH THROUGH THE DRIVING WIND, RAIN AND POSSIBLY HAIL, IN TIME FOR SAFETY.

109 THIS COMMUNITY BUILDING IN SALINA, KANSAS IS OF REINFORCED CONCRETE AND SAVED THE LIVES OF MANY MOBILE HOME OCCUPANTS.

110 ANOTHER APPROACH IS THE USE OF A BELOW-GRADE STORM SHELTER. SAFETY IS ALMOST ASSURED DUE TO THE WIND AND MISSILES PASSING OVER RATHER THAN AGAINST THE SHELTER. ITS MAJOR ADVANTAGE IS ITS IMMEDIATE PROXIMITY TO THE MOBILE HOME. IT CAN BE REACHED IN A MATTER OF A FEW SECONDS.

111 HOWEVER, THE FACT THAT THEY ARE LOCATED BELOW-GRADE, OUTSIDE THE RESIDENCE CREATES THE DISADVANTAGE THAT MOVING DOWN THE STAIRWAY MAY BE DIFFICULT FOR THE ELDERLY OR PERSONS WITH PHYSICAL HANDICAPS.

*Attachment 10-3
Senate local govt.
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- 122 FOR STRAIGHT-LINE WINDS OF A THUNDERSTORM, BUILDING ORIENTATION, LANDSCAPING, SUCH AS A HEDGEROW OR LINES OF HEAVY TREES CAN HELP REDUCE THE IMPACT OF HIGH WINDS. THESE FEATURES WILL NOT ADEQUATELY PROTECT RESIDENCES IN THE EVENT OF A TORNADO.
- 123 RESIDENTS OF MOBILE HOMES MUST EVACUATE TO A NEARBY STRUCTURE OFFERING PROTECTION AGAINST HIGH WINDS.
- 124 BE VERY ALERT TO WEATHER CONDITIONS DURING A TORNADO WATCH. BE PREPARED TO REACH SHELTER BEFORE THE TORNADO HITS.
- 125 ONCE AGAIN, EVACUATION IS A MUST. PROPER ANCHORING MIGHT SAVE YOUR HOME. AND SEEK AVAILABLE SHELTER: IT MIGHT SAVE YOUR LIFE.
- 126 BE ALERT TO WEATHER CONDITIONS DURING A TORNADO WATCH. KEEP YOUR "EYE ON THE SKY." YOU MAY BE THE FIRST PERSON TO SEE A TORNADO THAT COULD HIT YOUR RESIDENCE.
- 127 KNOW WHERE TO SEEK SHELTER IN YOUR RESIDENCE. GET TO THAT SPOT BEFORE THE STORM HITS. PROTECT YOUR HEAD FROM FLYING DEBRIS.
- 128 THIS PRESENTATION WAS DEVELOPED BY PROFESSOR JAMES ABERNETHY OF THE SCHOOL OF ARCHITECTURE, LAWRENCE INSTITUTE OF TECHNOLOGY.
- 129 IT INCORPORATES PREVIOUS STUDIES BY PROFESSOR UWE KOEHLER, BALL STATE UNIVERSITY; DR. JOSEPH EAGLEMAN, UNIVERSITY OF KANSAS AND THE INSTITUTE FOR DISASTER RESEARCH AT TEXAS TECH UNIVERSITY.
- 130 NOAA SEAL.

*Attachment 10-4
Senate local govt.
February 27, 1992*

Tornado Safety

Surviving Nature's Most Violent Storms

(With Tornado Statistics for 1953 - 1980)



*Attachment 11-1
Senate local govt
February 27, 1992*

Perhaps the most awesome sight in nature is the black funnel of the mature tornado. This one, photographed by the Storm Intercept Project of NOAA's National Severe Storms Laboratory, is 400 yards wide at its base. It occurred northeast of Seymour, Tex., April 10, 1979.



This remarkable sequence of photographs showing the birth and progress of a tornado was taken by Wolfgang Lange near Wichita Falls, Tex., April 10, 1979, when at least 15 tornadoes ripped



through Texas and Oklahoma killing 58, injuring more than 1,800, and causing nearly \$500 million in damage. In the first picture, a thin funnel is developing beneath the right side of the bowl-shaped



cloud at center. Seconds later two funnels are visible and a dust whirl has formed on the left side of the cloud. In the third picture, the tornado begins to pick up debris, disguising its multiple vortex struc-

Tornado: Nature's Most

Their time on Earth is short, and their destructive paths are rather small. Yet, when one of these short-lived, local storms marches through populated areas, it leaves a path of almost total destruction. In seconds, a tornado can reduce a thriving street to rubble.

It is the mission of NOAA, the U.S. Commerce Department's National Oceanic and Atmospheric Administration, to help mitigate the threat to life and property from natural haz-

ards. The National Weather Service, a major element of NOAA, provides the Nation's first line of defense against the awesome destructive force of the tornado. Through its tornado and severe thunderstorm watches and warnings, the National Weather Service gives persons in threatened areas time to find shelter. Further, the National Weather Service, in cooperation with the Federal Emergency Management Agency (FEMA), educates com-

munity officials and the public through its disaster preparedness program, on what to do when severe storms threaten.

This booklet is part of the preparedness service. It is designed to increase your understanding and awareness of the tornado hazard, explain the National Weather Service Watch and Warning program, and provide you lifesaving safety precautions.

Tornado Characteristics

By definition, a tornado is a violently rotating column of air in contact with the ground. The air column may be seen when it contains condensation in the form of a cloud or when it contains surface dust and debris. Often its appearance is a result of both. When a tornado touches the ground there usually is a swirl of dust and debris even when the visible cloud portion is missing or fails to reach all the way to the ground. When the column of air is aloft and does not produce damage, the visible portion is properly called

a funnel cloud. A waterspout is a tornado in contact with a water surface.

Tornadoes vary greatly in size, intensity, and appearance. Most (62 percent) of the tornadoes that occur each year fall into the weak category. Wind speeds are in the range of 100 miles an hour or less. Weak tornadoes account for less than 3 percent of all tornado deaths. About one out every three tornadoes is classified as *strong*. Wind speeds reach about 200 miles an hour with an average path length of 9 miles and a width of 200 yards. Almost 30 percent of all tornado deaths occur each year from this type of storm. Nearly 70 percent of

all tornado fatalities result from *violent* tornadoes. Although very rare (only about 2 percent are violent), these extreme tornadoes can last for hours. Average path lengths and widths are 26 miles and 425 yards, respectively. The largest of these may exceed a mile or more in width, with wind speeds approaching 300 miles an hour.

The color of a tornado is determined by a number of factors such as the amount and direction of sunlight and the type of debris being picked up at the surface. Not only does the shape of a tornado vary from one storm to another, but an individual tornado usually changes its shape frequently during its life



ture. In the fourth picture, the tornado is well-developed and is approaching Wichita Falls (and the photographer!) at about 45 m.p.h. In the fifth picture, the expanding tornado has closed to

within 2 miles of the photographer. The building on the left, a high school, was devastated by the storm a few minutes later. The tornado is only a mile away in the last picture. The photographer saved

his life after taking the picture by running into an apartment house laundromat and covering his head with a metal trash can.

*Attachment 11-3
Senate Social Govt
February 27, 1992*

Violent Storm

cycle. During the late stages of a tornado's life, it is not unusual for the tornado to become highly tilted and shrink in size. This reduction in size does not mean that it is less intense. It is still very dangerous! With exceptionally large tornadoes, the classic "funnel shape" may be absent. The tornado may appear to be a large, turbulent cloud near the ground. It may even be mistaken for a large rain shaft or even a non-weather event such as a fire.

Sometimes a series of two or more tornadoes is associated with a parent thunderstorm. Occasionally, two or more tornadoes can occur simultaneously, extending downward from the same thunderstorm. As the parent thunderstorm moves along, tornadoes may form, travel along in contact with the ground, and dissipate or lift, followed shortly by other tornado touchdowns, and so on. Tornadoes can also be made up of a number of smaller but intense vortices that rotate about a common center. With this type, the most intense damage is concentrated along the paths of the small vortices.

While an individual tornado usually destroys a relatively small area, major tornado outbreaks may cause widespread damage over an extensive area. During the afternoon and evening of April 3 and the early morning of April 4,

1974, a "super outbreak" of 148 tornadoes across 13 states killed more than 300 people, injured more than 6,000, and caused \$600 million in damage. On March 18, 1925, the Tri-State tornado traveled some 219 miles across Missouri, Illinois, and Indiana. It lasted for over 3½ hours and killed 689 people.

Except for weak tornadoes and waterspouts in coastal areas, tornadoes usually develop from strong or severe thunderstorms. Most significant tornadoes have their origin within the right rear quadrant of the thunderstorm where a circulation develops at heights between 15,000 and 30,000 feet. A tornado or funnel cloud is observed when this circulation develops further downward toward the surface. Tornado development can also occur along the leading edge of a single thunderstorm or line of thunderstorms. While dangerous, such tornadoes are usually weak and short-lived.

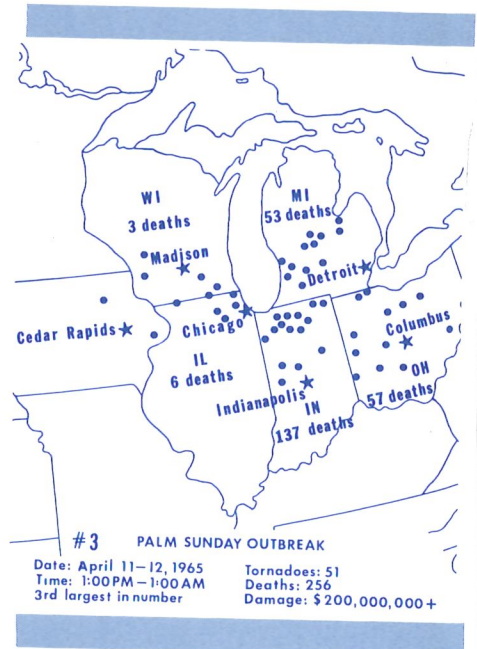
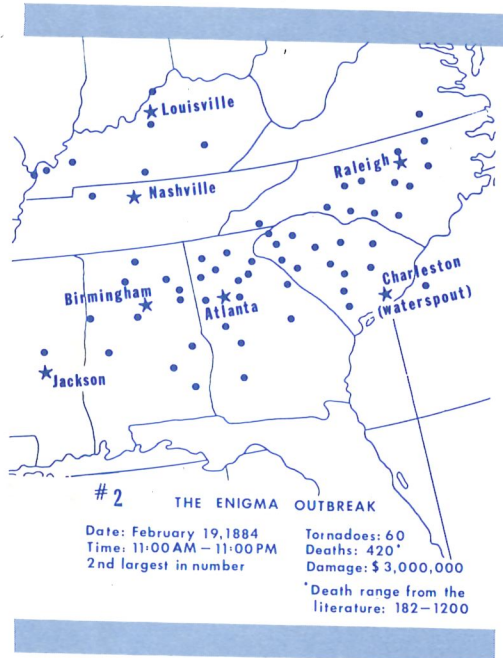
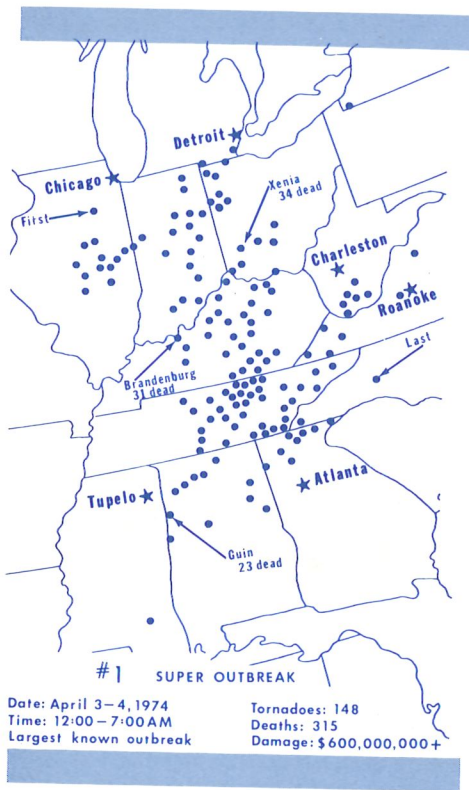
Tornado Destruction

Every tornado is a potential killer and many are capable of great

destruction. Tornadoes can topple buildings, roll mobile homes, uproot trees, hurl people and animals through the air for hundreds of yards, and fill the air with lethal, windborne debris. Sticks, glass, roofing material, lawn furniture all become deadly missiles when driven by a tornado's winds. In 1975, a Mississippi tornado carried a home freezer for more than a mile. Tornadoes do their destructive work through the combined action of their strong rotary winds and the impact of windborne debris. In the most simple case, the force of the tornado's winds push the windward wall of a building inward. The roof is lifted up and the other walls fall outward. Until recently, this damage pattern led to the incorrect belief that the structure had exploded as a result of the atmospheric pressure drop associated with the tornado.

Mobile homes are particularly vulnerable to strong winds and windborne debris. Because they have relatively large surface area to weight ratios, they are easily overturned by high winds. Their thin walls make them extremely vulnerable to wind blown debris. Even if tied down, they should be evacuated for more substantial shelter. Mobile home parks should have storm shelters for their residents if located in areas where strong thunderstorms or tornadoes occur.

A Deadly Half Dozen: Six of the Nation's Worst Tornado



TORNADO FACTS THAT CAN

Tornadoes travel at an average speed of 30 miles an hour, but speeds ranging from stationary to 70 miles an hour have been reported. While most tornadoes move from the southwest to the northeast, their direction of travel can be erratic and may change suddenly.

In populated areas, it is very dangerous to attempt to flee to safety in an automobile. Over half of the deaths in the Wichita Falls tornado of 1979 were attributed to people trying to escape in motor vehicles. While chances of avoiding a tornado by driving away in a vehicle may be better in open country, it is still best in most cases to seek or remain in a sturdy shelter such as a house or building. Even a ditch or ravine offers better protection than a vehicle if more substantial shelter is not available.

While hail may or may not precede a tornado, the portion of a thunderstorm adjacent to large hail is often the area where strong to violent tornadoes are most likely to occur.

Once large hail begins to fall, it is best to assume that a tornado may be nearby, and seek appropriate shelter. Once the hail has stopped, remain in a protected area until the thunderstorm has moved away. This will usually be 15 to 30 minutes after the hail ceases.

The tornado's atmospheric pressure drop plays, at most, a minor role in the damage process.

Most structures have sufficient venting to allow for the sudden drop in atmospheric pressure. Opening a window, once thought to be a way

to minimize damage by allowing inside and outside atmospheric pressures to equalize, is not recommended. In fact, if a tornado gets close enough to a structure for the pressure drop to be experienced, the strong tornado winds probably already will have caused the most significant damage. Furthermore, opening the wrong window can actually increase damage.

While most tornado damage is caused by the violent winds, most tornado injuries and deaths result from flying debris.

Small rooms, such as closets or bathrooms, in the center of a home or building offer the greatest protection from flying objects. Such rooms are also less likely to experience roof collapse. Always stay away from windows or exterior doors.

Outbreaks



#4 TRI-STATE OUTBREAK
 Date: March 18, 1925
 Time: 1:00 PM - 6:00 PM
 Greatest death toll
 Tornadoes: 7
 Deaths: 740
 Damage: \$18,000,000



#5 TUPELO - GAINESVILLE OUTBREAK
 Date: April 5-6, 1936
 Time: 8:00 PM - 9:00 AM
 2nd greatest death toll
 Tornadoes: 17
 Deaths: 446
 Damage: \$18,000,000



#6 ST. LOUIS, MO. OUTBREAK
 Date: May 27, 1896
 Time: 2:00 PM - 8:00 PM
 Northwest Flow conditions
 Tornadoes: 18
 Deaths: 306
 Damage: \$15,000,000

SAVE YOUR LIFE

Tornado wind speeds increase with height within the tornado.

Storm cellars or well constructed basements offer the greatest protection from tornadoes. If neither is available, the lowest floor of any substantial structure offers the best alternative. In high-rise buildings, it may not be practical for everyone to reach the lower floors, but the occupants should move as far down as possible and take shelter in interior, small rooms or stairwells.

Tornado winds may produce a loud roar similar to that of a train or airplane.

At night or during heavy rain, the only clue to a tornado's presence may be its roar. Thunderstorms can

also produce violent straight-line winds which produce a similar sound. If any unusual roar is heard during threatening weather, it is best to take cover immediately.

Although most tornadoes occur during the mid-afternoon or early evening (3 p.m. - 7 p.m.), they can occur at any time; often with little or no warning.

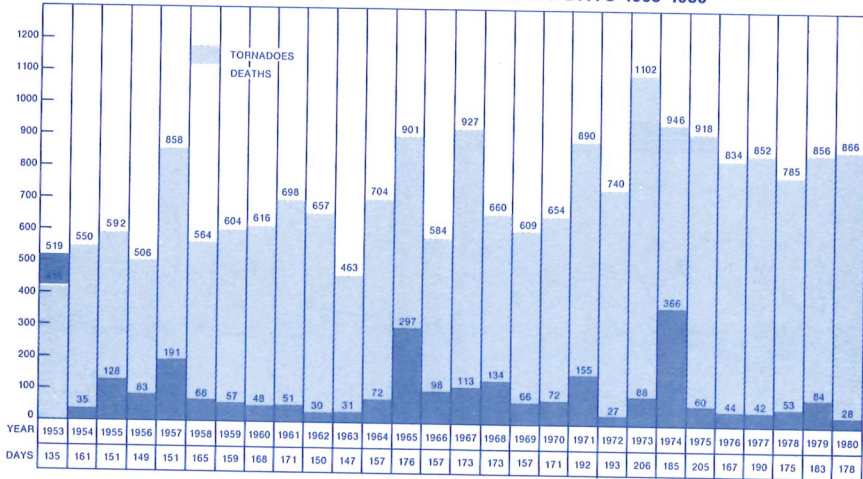
The key to survival is advanced planning. All members of a household should know where the safest areas of home are. Identify interior bathrooms, closets, halls or basement shelter areas. Be sure every family member knows that they should move to such safe areas at the first signs of danger. There may be only seconds to act. Have a tornado emergency plan at work.

Encourage area schools to form a tornado plan and conduct drills.

Tornadoes occur in many parts of the world and in each of the 50 States. However, no area is more favorable to their formation than the continental plains and Gulf Coast of the U.S. during April, May and June. Tornadoes are least frequent in the United States during the winter months, although damaging tornadoes can develop at any time of year.

*Attachment #12
 We all got
 good
 2/27/97*

TORNADOES, DEATHS, AND TORNADO DAYS 1953-1980



The National Weather Service Watch/Warning System

At NOAA's National Severe Storms Forecast Center (NSSFC) in Kansas City, Mo., National Weather Service meteorologists monitor atmospheric conditions in North America using surface weather observations from hundreds of locations, radar information, satellite photographs, temperature, moisture, and wind speeds in varying levels of the atmosphere; and reports from pilots. Combining these thousands of pieces of information, NSSFC forecasts are able to determine the current state of the atmosphere. When threatening conditions are detected, the work of issuing watches and warnings begins!

A WATCH is issued by the NSSFC to indicate when and where severe thunderstorms and/or tornadoes are *most likely to occur*. A Severe Thunderstorm Watch implies that the storms may develop to significant strength to produce large hail ($\frac{3}{4}$ inch or greater in diameter) and/or damaging winds. Since all severe thunderstorms are potential tornado producers, a Severe Thunderstorm Watch does not preclude the occurrence of tornadoes. A Tornado Watch means that conditions are favorable for the occurrence of both tornadoes and severe thunderstorms.

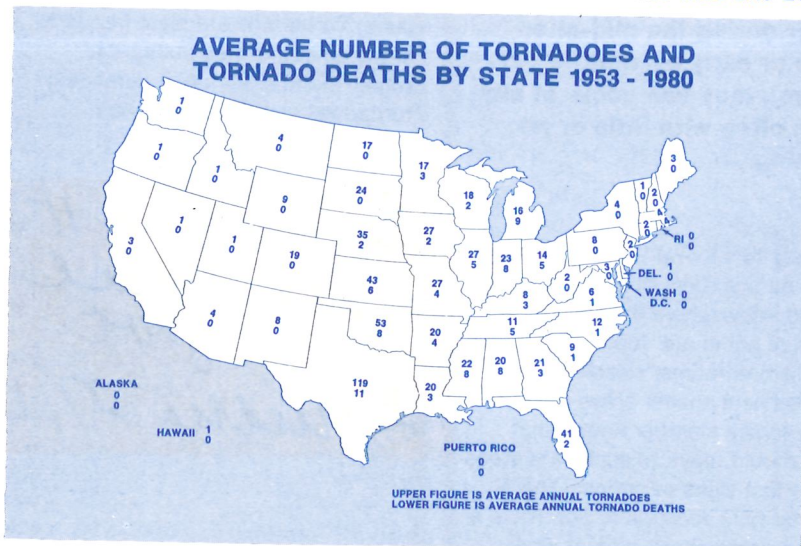
Watches are usually issued for areas about 140 miles wide and 200

miles long. During a Tornado Watch, everyone in or near the Watch area should be alert for signs of threatening weather and make preliminary plans for action. Listen to NOAA Weather Radio, commercial radio, or television for further information.

WARNINGS are issued by local National Service Offices when severe thunderstorms or tornadoes are indicated by radar or reported by trained spotters or other reliable sources. While radar is an invaluable tool, it cannot be relied upon totally to identify all severe weather. Trained spotters with rapid communication capabilities are critical to the warning process. **SKYWARN** spotter networks are composed of volunteers such as Amateur Radio and Citizen's Band radio groups as well as emergency service units such as police, firemen and Civil Defense personnel. The **SKYWARN** spotter networks are the backbone of the warning service and save many lives each year.

Yet, even the best combination of radar and trained spotters cannot identify all tornadoes and severe thunderstorms. If you see a tornado or funnel cloud, report it immediately to a local government agency and ask them to relay your report to the National Weather Service. Tornadoes can occur without warning, and your report and actions could not only save your life but others as well.

A **WARNING** will describe the area at risk from a tornado or severe thunderstorm. This is determined from the location, size, direction, and speed of movement of the storm (which can be erratic). A severe thunderstorm presents the danger of damaging winds, large hail (three-fourths of an inch in diameter or larger), lightning and heavy rainfall. Listen closely to the information contained in the warning. If a tornado is nearby, take protective cover immediately. At times, you may be in a warning area, but the reported tornado may not be nearby. Remember, you may still be at risk and should be prepared to take cover since the storm may be moving your way or may even produce additional tornadoes or damaging winds.



Individual And Community Actions

The burden of heeding warnings and taking proper action rests with individual communities and citizens. It is in your best interest to support local civil defense or emergency management agencies in their efforts to develop effective community warning systems. Furthermore, you should insure that your place of business and school systems have plans for action and conduct drills for severe weather emergencies. Advance planning is the key to survival.

At the very minimum, you should insure that all your family members understand the following terms and practice the proper safety precautions.

TORNADO (SEVERE THUNDER-STORM) WATCH—Tornadoes and/or Severe Thunderstorms are possible.

TORNADO (SEVERE THUNDER-STORM) WARNING—Tornadoes and/or Severe Thunderstorms are occurring. The National Weather Service defines a Severe Thunderstorm as having winds of 58 miles per hour or more, or hail three-fourths of an inch in diameter or larger.

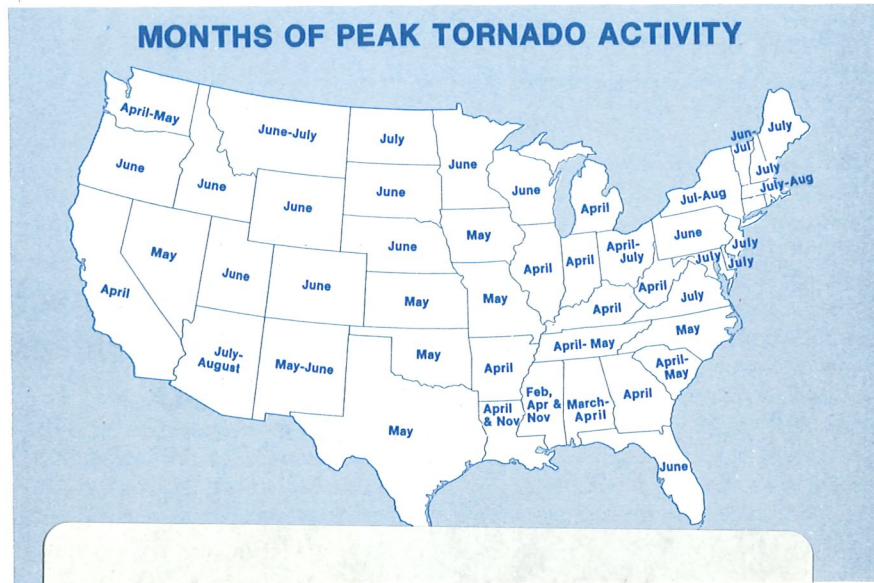
DAMAGING WINDS—Can cause tornado-like damage. Mobile home occupants should seek sturdy shelter.

LARGE HAIL—Can cause serious injury. Stay indoors.

HEAVY RAINS— May result in flash flooding. Do not drive across flowing waters. Don't let your children play near drainage ditches or streams.

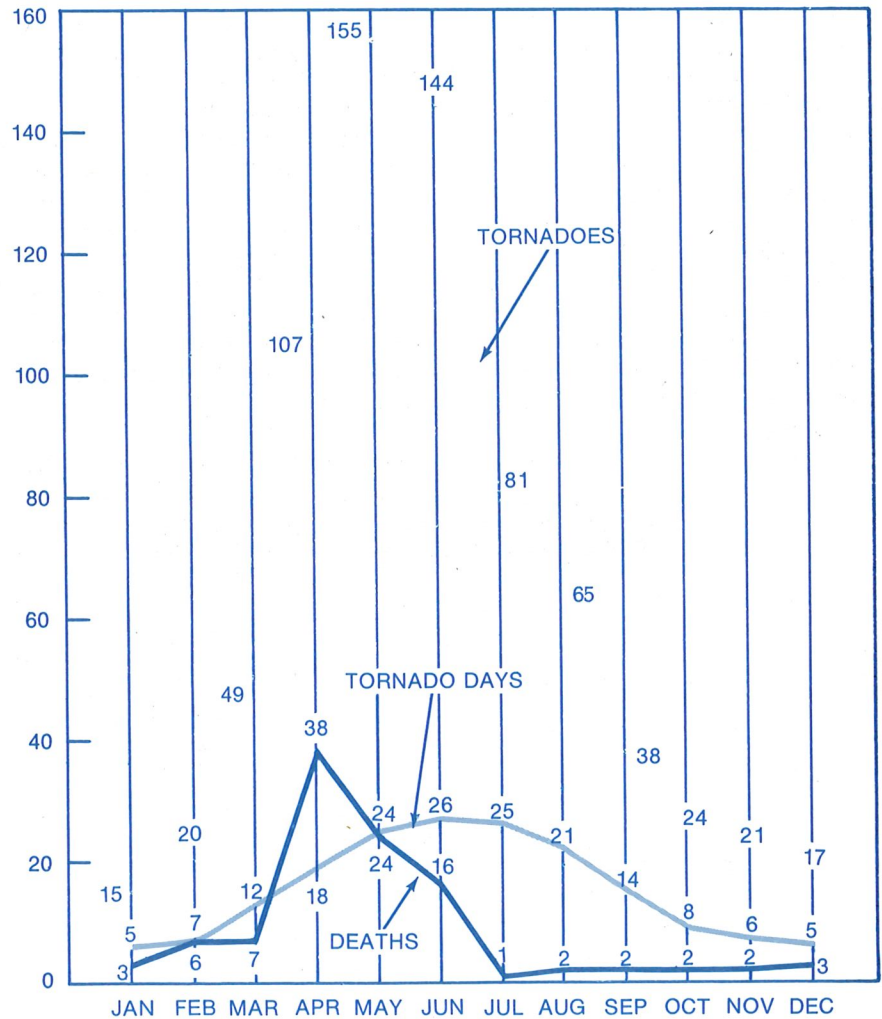
LIGHTNING—Kills more people each year than tornadoes or hurricanes.

(Continued on back page)



*Attachment 11-4
State local advt
February 7, 1992*

TORNADO INCIDENCE BY MONTH 1953-1980

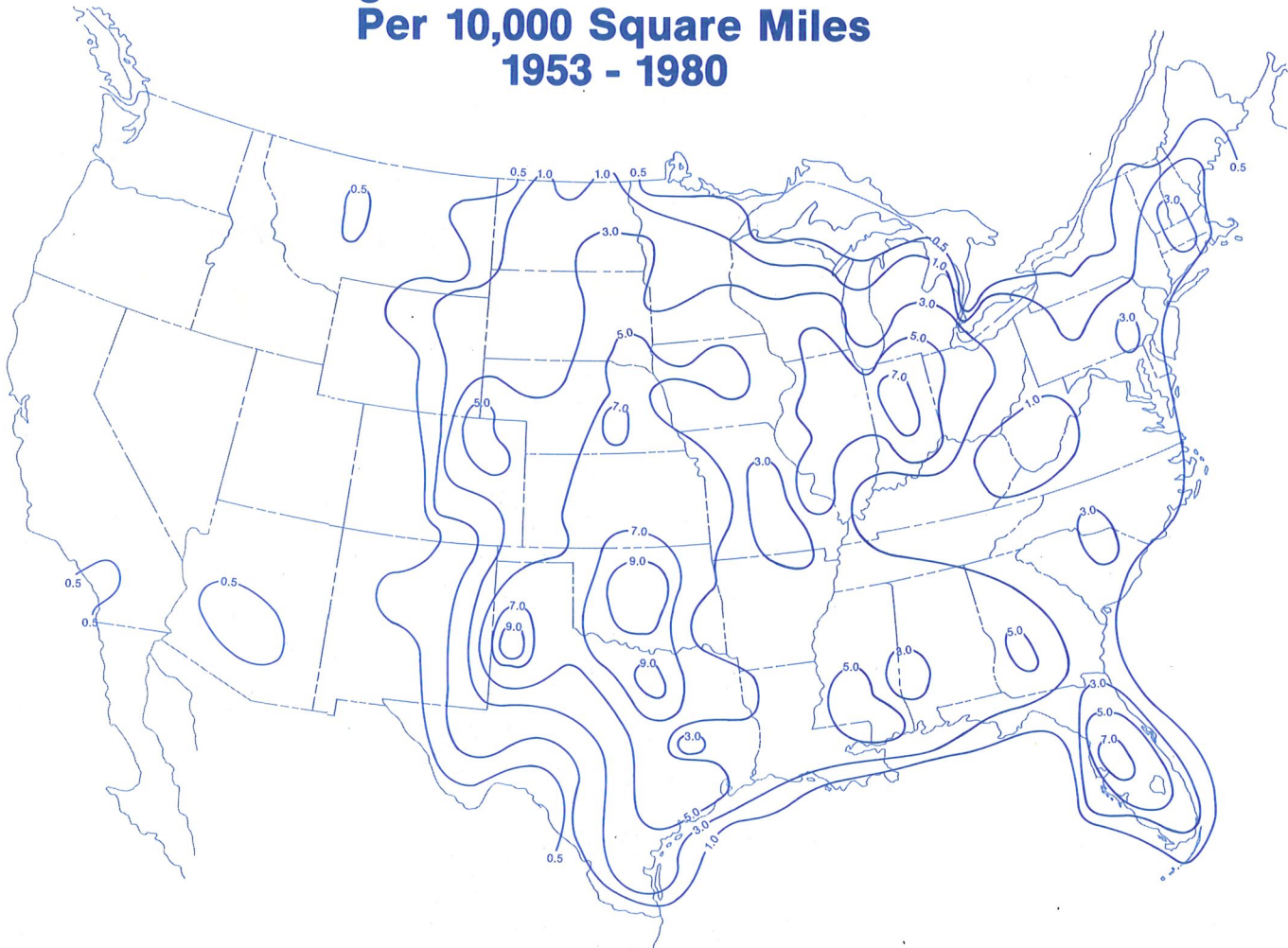




OFFICIAL BUSINESS

Penalty for Private Use, \$300

Average Annual Tornado Incidence Per 10,000 Square Miles 1953 - 1980



Actions (continued)

Stay indoors and away from electrical appliances. Outdoors, stay away from high or conductive objects.

TORNADOES—Require immediate action!

Stay away from windows, doors and outside walls!

Protect your head!

In homes and small buildings—go to the basement or to an interior part of the lowest level if an under-

ground shelter is not available.

Closets, bathrooms, and interior halls offer the best protection in many cases. Get under something sturdy.

In schools, nursing homes, hospitals, factories, and shopping centers, go to pre-designated shelter areas. Interior hallways on the lowest floor are usually best.

In high-rise buildings, go to interior small rooms or hallways on as low a floor as possible.

In mobile homes or vehicles, leave and take shelter in a substantial structure. If there is no nearby shelter, lie flat in the nearest ditch or ravine with your hands shielding your head.

ALWAYS STAY INFORMED—Listen to NOAA Weather Radio, television and commercial radio for the latest National Weather Service Watches, Warnings, and Statements.

11-8

27 February 1992

To: Whom It May Concern

From: Rosemary Niederhofer
24350 126th Street
Leavenworth, KS 66048

Subject: Topeka, KS Tornado - May 5, 1983

On May 5, 1983 my residence was a mobile home at 1006 SE 42nd Street in the Ridgewood Estates Mobile Home Park. At about 5pm the National Weather Service triggered the alarm on my NOAA Weather Radio receiver and issued a Tornado Warning. My son and I had approximately 10 minutes to leave our mobile home to go to safety. Luckily our home was just five lots away from the storm shelter.

When we arrived at the shelter, many of the park residents were in the shelter or on their way down the street. The tornado struck within a few minutes. When we emerged from the shelter, we were stunned by the total destruction of the mobile homes directly behind the shelter and to the west of us. The tornado had gone directly over the shelter, where we were protected.

The couple that left the shelter just ahead of us found their home in two parts and it had rolled over onto the home in the adjacent lot. The occupant of that mobile home was in the shower at the time, where he did not hear the warnings, and became the only fatality of this disaster. Many of the homes had imploded or were torn apart, even though they were equipped with tie downs. Ridgewood Estates management was very strict about proper tie-down of their residents mobile homes.

If the shelter had not been available to the residents, there is no doubt that there would have been many more deaths. I strongly believe that all mobile home parks should provide sufficient shelter(s) that are located so that all residents can reach safety in a timely manner.

I realize that the initial cost is a major concern to the park owners. I'm sure it will be recovered in lot rental. Can we, in good faith, compare that cost to unnecessary deaths? Mobile home residents need a safe place to go during severe weather - if the mobile home park owner doesn't provide it, who will?

Sincerely,

Rosemary Niederhofer
Rosemary Niederhofer

Attachment 12-1
Private Social Govt
Feb 27, 1992

KANSAS EMERGENCY PREPAREDNESS ASSOCIATION

AN ASSOCIATION OF LOCAL EMERGENCY PREPAREDNESS ORGANIZATIONS

Remarks on Senate Bill Number 586

By Randall C. Duncan, CEM

Coordinator, Cowley County Civil Defense

Representing the

Kansas Emergency Preparedness Association

To the Honorable Committee Chair, Senator Audrey Langworthy:

It is the pleasure of the Kansas Emergency Preparedness Association (KEPA) -- which represents the local emergency management/civil defense coordinators in 54 counties across the state -- to offer the following remarks to be entered into the hearing record for the hearing on Senate Bill No. 586.

We fully support Senate Bill No. 586 by Senator Norma Daniels as introduced. We believe it provides for the safety and welfare of Kansas Citizens who choose to reside in mobile home parks. After the experience of the residents of the Golden Spur Mobile Home Park in Andover, we believe that all parks, as defined by SB 586, should be equipped with properly ventilated shelters with the appropriate room for residents. We believe that these shelters should be accessible to and useable by handicapped persons. We further believe that these shelters need to be accessible 24 hours a day.

These shelters can provide the necessary element of additional safety to enhance the prospects of living within a mobile home park. The residents of a park should be greatly reassured to know that a shelter is immediately available to them which is conveniently or centrally located within their area. This additional safety factor added to mobile home parks may result in an increasing demand for manufactured housing.

Dr. Scott Lillibridge, M.D., in his capacity as a physician with the Epidemic Intelligence Service Center for Environmental Health and Injury Control at the Centers for Disease Control, Atlanta, Georgia, has made an extensive study of the fatalities and survivors in Andover, Kansas. He said to me in a telephone call on Wednesday, February 19, 1992 that it was interesting to note in the case of the Golden Spur Mobile Home Park the differences between the park itself and the single-family site-built dwellings adjacent.

Attachment 13-1
Senate Localgovt
Feb 27, 1992

PREPARE TODAY - ALIVE TOMORROW

The fatalities and serious injuries were confined to the park area, and the single-family site-built dwellings next door experienced little injury and no fatalities. Dr. Lillibridge informs me he plans to release results from his study in Wichita on Thursday, March 26, 1992.

His comments are further supported, however by previous research into tornado injuries and fatalities. A study entitled "Injuries from the Wichita Falls Tornado: Implications for Prevention," by Roger I. Glass, Robert B. Craven, Dennis J. Bregman, Barbara J. Stoll, Neil Horowitz, Peter Kerndt and Joe Winkle as published in the 15 February 1980 SCIENCE journal, page 737, states in part...

"Mobile homes fare poorly in severe straight-line windstorms and tornadoes. Proper tiedowns that anchor the trailer are effective when wind speeds do not exceed 50 miles per hour, but cannot protect a mobile home in greater winds or from a direct tornado hit. The high rate of injury we observed, despite the small number of cases and the nonrandom sample, is consistent with previous observations and research."

The recommendations section of this same study also states, "People in single-family homes in a tornado-prone area should identify and reinforce some interior portion of their home as a shelter. Mobile-home parks should provide community shelters for their residents..."

Another study, entitled "Risk Factors for Tornado Injuries," by Millicent Eidson, Jeffrey A. Lybarger, John E. Parsons, J. N. MacCormack and John I. Freeman as published in the International Journal of Epidemiology (Vol 19, No. 4) deals with the tornadoes in North and South Carolina on 28 March, 1984. The study states, "People living in mobile homes were more likely to be hospitalized or die than people occupying conventional houses (page 1051)."

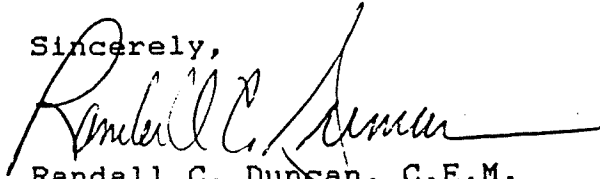
The study also further states, "The results of our study also increase the concern about the risk of mobile homes, and offers support for previous advisories for mobile home residents to leave their homes and for requiring regulations for tie-downs and safer shelters to be provided in mobile home parks."

For these reasons, and more, the members of the Kansas Emergency Preparedness Association-- representing local civil defense/emergency management coordinators/directors in 54 counties in Kansas -- request the committee to consider reporting favorably on SB 586.

*Attachment 13-2
Senate Local Govt
Feb 27, 1992*

Thank you for your consideration in this matter. Should further information or amplification of statements or information be deemed necessary, we will be happy to provide whatever is requested.

Sincerely,



Randall C. Duncan, C.E.M.
Certified Emergency Manager
Coordinator
Cowley County Civil Defense
2701 East 9th Street
Winfield, Kansas 67156
(316) 221-0470
FAX (316) 221-1074

Legislative Information Chair
Kansas Emergency Preparedness Association

RCD: me

cc: Kansas Division of Emergency Preparedness

Attachment 13-3
Senate Local govt
Feb 27, 1992



Cowley County Civil Defense

2701 East 9th

P. O. Box 736

Winfield, KS 67156

(316) 221-0470

RANDALL C. DUNCAN
Coordinator

February 20, 1992

Honorable Senator Norma Daniels
State Office Building
Topeka, Kansas

Senator Daniels,

Attached, please find remarks on behalf of the Kansas
Emergency Preparedness Association (KEPA) which we would
request that you add to the hearing record for Senate Bill
No. 586.

We are pleased at the opportunity we have to support you on
the introduction of this important measure, which could have
a major impact on the safety of mobile home parks, as defined
in your proposed legislation.

Good luck in the hearings, and we hope for a favorable report
out from committee.

If we can be of further assistance on this matter, please
call.

Sincerely,

Randall C. Duncan, CEM
Certified Emergency Manager
Coordinator
Cowley County Civil Defense

RCD:me

enc: Remarks

cc: Kansas Division of Emergency Preparedness

Attachment 13-4
Devote Local Govt
Feb 27, 1992



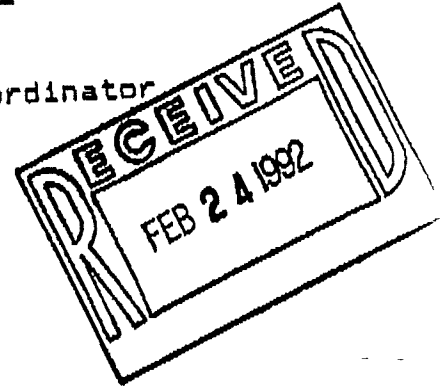
U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE

2142 S. Tyler Road
Wichita, KS 67209

February 20, 1992

TO: Randall C. Duncan
Cowley County Emergency Preparedness Coordinator

FROM: *Steven D. Schurr*
Steven D. Schurr
Warning and Coordination Meteorologist



SUBJECT: Tornado Fatality Statistics

I obtained the following statistics from Linda Krenkau, Program Assistant at the Warning and Forecast Branch of National Weather Service Headquarters. Linda's phone number is: 301-713-0090. I hope the data helps support the Mobile Home Shelter Bill proposed before the Kansas Legislature this term.

The statistics show the number of Tornado Fatalities nationwide, and the locations where they occurred. Data for 1985 through 1990 are considered firm, while that for 1991 is still preliminary. In 1985, only the four categories shown were available.

The 1991 numbers show a variance in the totals for Mobile Homes and Outdoors. This variance is a result of the Andover Storm that claimed 13 lives in the Golden Spur Mobile Home Park. Six people were killed while in their mobile homes, one was killed while in a shed adjacent to his mobile home, and six more died while on their way from their homes to the central shelter. Were all 13 fatalities directly related to mobile homes? I think so, but they will likely be shown finally as six in mobile homes and seven outdoors.

Year	Total	M= Mobile Homes		H= Site-built Homes		V= Vehicles		S= Schools		O= Outdoors		B= Buildings		X= Other	
		M	H	B	S	V	O	X							
1991	40	23/16						4		5/12	8	(Preliminary)			
1990	53	7	11	15	5	14	1								
1989	50	12	8	4	9	16	1								
1988	32	21	6	2		3									
1987	59	24	7			3			3						
1986	15	7	3			3			2						Saragosa, TX
1985	94	28	40			4				22					OH & PA
Total	303	99	75			43									

Attachment 13-5
Senate Local govt
Feb 27, 1992

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To	R.C. DUNCAN	From	MARY COB
Co	CIVIL DEFENSE	Co	CIVIL DEFE
Dept		Phone #	

When the percentages of people living in mobile homes versus site-built structures is applied to the above statistics, I feel it is evident that the threat is far greater in mobile homes. In addition, many site-built homes have underground shelters (basements or cellars) available.

Let me know if I can be of further assistance. Good luck on finding sufficient statistics and support for the Bill. I feel the safety of those Kansans living in mobile homes would be improved by a law requiring shelters in mobile home parks.

Attachment 13-6
Senate Social Govt
Feb 27, 1992

SUMMARY OF TESTIMONY

Before the Senate Local Government Committee

February 27, 1992

Presented by the Kansas Highway Patrol

(Lieutenant Frank Goddard for Colonel Bert Cantwell)

I appear in support of SB 586 which requires storm shelters for mobile home parks.

I have been a Kansas Highway Patrolman for thirty-three years. I have seen, spotted and tracked many tornados during that time. I have also lived in a mobile home from 1976 to 1981 in Gas, Kansas. There were 25-30 units in that park and no storm shelter was available. The nearest shelter was the grade school, almost a mile away.

In 1981, I moved my mobile home to the Golden Spur Mobile Home Park in **Andover, Kansas**, where I lived until April 26, 1991. I need not remind this committee what happened that day, we lost everything.

The storm shelter at that park was too small to accommodate the 250 units. It was approximately 95 feet long and 12 feet wide. (1176 sq. ft.) That amounted to 4.7 sq. ft. per family. The shelter had no handicap access, no parking and was nearly 1/2 mile from some of the homes.

When the tornado approached, I headed for the shelter, but there were cars parked in the streets all around it and people on the steps to the entrance, giving the appearance that the shelter was full. With only 4 or 5 minutes to go, I elected to stay in the car and drive away from the storm.

In summary, that storm killed and injured many of my neighbors who could not or would not go to the storm shelter, however, it should be pointed out that if every one had decided to go to the shelter, the capacity was not sufficient for them to take cover. I might also point out that no one in the shelter was killed or injured. I would therefore ask for your support of SB 586.

Thank You.

*Attachment 14-1
Senate Local govt
Feb 27, 1992*

TESTIMONY BEFORE THE
SENATE
LOCAL GOVERNMENT COMMITTEE

TO: Chairperson Audrey Langworthy and
Members of the Committee

FROM: Richard J. Peckham
President, Mobile Manor Inc.
Andover, Kansas

DATE: February 27, 1992

RE: SB 586

I serve as president of Mobile Manor Inc., a Kansas corporation which operates several mobile home parks in Sedgwick and Butler counties, including the Golden Spur mobile home park in Andover which was devastated by the tornado April 26, 1991. We have approximately 1000 mobile home tenants.

In comparing HB 2936 and SB 586, I see substantial differences, and I strongly urge the committee to adopt a mobile home park storm shelter provision using the essence of HB 2936, applying to new construction only, and requiring not more than 8 square feet of storm shelter space per mobile home for the following reasons:

The April 26th tornado was carefully studied by Dr. Scott Lillibridge from the Center for Disease Control in Atlanta, Georgia. He conducted an exhaustive analysis of the tornado path, the people involved, causes of death and injury, and the storm warning and preparedness systems. In my discussions with Dr. Lillibridge, the evidence seems to show the following:

1. Approximately 90%-95% of the people at the Golden Spur mobile home park received adequate and timely warning sufficient to take shelter in one of the various below-

*attachment 15-1
Senate Local govt
Feb 27, 1992*

ground facilities in Andover. The majority of the tenants who were in the park vicinity did take shelter in a variety of locations in Andover, including the Golden Spur storm shelter.

2. Of the mobile home park residents who were killed or injured in the storm, the majority failed or refused to heed the storm warning. Joe Marks, 68, refused to step across the street from Livingston's Restaurant to the Pizza Hut basement along with the other restaurant patrons when the tornado was sighted, and instead walked across the street and into the path of the storm. After his death, the other tenants noted that he had frequently refused to use the storm shelter in times past. Robert Meininger, 46, ignored pleas from his family to go to the park shelter. His wife found his body in the wreckage the following day.

3. No one in the Andover mobile home park died for lack of available below-ground storm shelter in the city.

4. Also, approximately 80% of the mobile home parks in the Wichita area already have storm shelters; whereas a survey by the Sedgwick County Manufactured Housing Association confirmed that 17 out of 18 apartment complexes in the area had no underground storm shelters.

5. The Golden Spur storm shelter (1104 square feet) adequately protected all of those who sought its refuge, estimated between 150 and 175 people, with a capacity for approximately 500 people. Dr. Lillibridge found the shelter entirely functional and adequate for the task of protecting the park tenants. The shelter contained 4.58 square feet per mobile home.

6. Consequently, a requirement of 18 square feet per home would have been unnecessarily expensive, and the additional square footage beyond 5 to 8 square feet would bear no relationship to the safety factor, but would unfairly penalize mobile home park tenants who would pay the substantial increase in park operation costs through higher rents, an unwise and unprofitable surcharge on the Kansas economy. (At \$30 /sq. ft., a requirement of 18 sq. ft. per home would cost \$130,000.00 for a storm shelter to service 241 homes, the size of the Golden Spur park. At 8 sq. ft. the cost would be \$57,000.)

7. Dr. Lillibridge found that the local government systems for emergency preparedness, storm warning, communication and education of the public were inadequate. Dr. Lillibridge had concluded that the primary focus of government efforts should be in the areas of education and preparedness.

Attachment 15-2
Senate Social Govt
Feb 27, 1992

8. The injuries and deaths at Andover, despite ample underground shelters, demonstrates that poor public awareness of the nature and imminence of a tornado threat were the real causes of the loss of life. The findings of Dr. Lillibridge show that the town warning siren failed, and although some form of warning reached the vast majority, there was inadequate signal of immediate danger. Also, the people simply had no practical concept of how to respond to the general tornado warning.

9. Before this committee concludes its findings on this matter, the expert analysis and conclusions of Dr. Lillibridge of the C.D.C. should be carefully examined so that legislation accurately targets the real factors necessary to protect human life.

Existing mobile home parks should be grandfathered in view of the fact that most of them are land-locked without additional space to install an underground shelter.

In conclusion, local government emergency preparedness planning and practice, in conjunction with quality public education systems are the keys to public safety, and should be the primary focus of your legislative efforts. These measures should mandate preparedness systems. After careful review of the C.D.C. study, the committee could reasonably consider a mobile home park shelter for new construction, requiring 5 to 8 square feet per mobile home space. If the committee merely treats the storm shelter issue and misses the critical community preparedness planning needs, the public will be no better off than it was on April 26, 1991.

Attachment 15-3
Senate Local govt
Feb 27, 1992

Good Morning Ladies and Gentlemen:

My name is Clint Loder and I live in Salina, Ks.

I would like to say a few things this morning regarding the proposed Senate Bill #586 and House Bill #2936 that have to do with storm shelter requirements in mobile home parks.

I own a 10 space mobile home park in Salina that I rely heavily upon for my income. If I am forced to provide a storm shelter I will have to come up with \$10,000 to \$12,000. I cannot afford to pay for this myself and if I were to try to pass this on to the tenant it would mean a monthly rent increase to them of approximately 40%. I live in a mobile home myself and do not have a shelter. If I thought a shelter was a necessary I certainly would have tried to have one by now.

I guess the first thing that came to mind when I first heard of this proposed legislation was what about all the apartments, duplexes, and houses that are in my neighborhood? Why wouldn't these people also have to construct shelters?

It seems to me like to be fair on this issue a person should ask, "why isn't our local government getting involved here?"

*Attachment 16-1
Senate Local Govt
Feb 27, 1992*

In talking to our city Emergency Preparedness director I find that our local community is not being made aware of where a person or family can seek shelter and the reason for that is very simple..... There are no public shelters!!

Why then should we as Mobile Home Park owners be required to construct and pay for storm shelters when our own City and County governments do not do so? The discrimination here seems obvious.

This law would generally affect the older smaller parks like myself who do not have the financial means nor the physical ground space to construct something like this.

If it's deemed that storm shelters are necessary to live here in our state to protect ourselves then the obvious solution would be for our local government to build these shelters so that everyone who doesn't have a basement would be protected. I have to believe that local governments don't want to pay this cost any more than mobile home park owners do. So, why should we be singled out? I trust you all will use your best judgement and be fair with us on this issue.

Thankyou all very much.

*Attachment 16-2
Denate Local govt
Feb 27, 1992*