

**Estimated Losses Caused
by Wood Products Insects During 1970
for Single-Family Dwellings
in 11 Southern States**

**LONNIE H. WILLIAMS
AND
RICHARD V. SMYTHE**

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Summary

In 1970, owners of single-family dwellings in 11 southern States spent an estimated \$143 million (1976 dollars) to prevent and control subterranean termites and wood-destroying beetles. Losses incorporated into this estimate include: \$79.4 million for corrective or remedial termite treatments, \$13.8 million for preventive or pretreatment of termites, \$12.9 million for remedial beetle treatments, and \$37.0 million for contract renewals or damage insurance. Depending upon remedial costs and termite damage repair costs, an additional \$12.3 million to \$19.5 million for treatment and \$38.6 million for damage repaired by someone other than the pest control industry could be added to the loss estimate. Also, the estimate would be increased significantly by adding losses in multifamily dwellings and nonresidential construction. Although loss from replacement of termite-damaged wood probably has decreased, expanded research application efforts can reduce losses further if current termite prevention and control measures remain available.

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Although we were helped by many people, the validity of the data and the expressed opinions are our responsibility. We used the charges shown for various pest control services for estimation purposes only, and we do not suggest they serve as "normal" charges for these services.

Estimated Losses Caused by Wood Products Insects During 1970 for Single-Family Dwellings in 11 Southern States

*LONNIE H. WILLIAMS
AND
RICHARD V. SMYTHE*

Introduction

Wood products insects (WPI), subterranean termites and various wood-destroying beetles, occur in all States and United States possessions except Alaska. Because WPI primarily attack seasoned, processed wood in use, these insects cause enormous economic losses, but data have never been compiled and published to document loss estimates for the nation or even for the South where these insects are most prevalent. Estimates of annual national losses from termite damage and control range from \$100 million (Lund 1967) to \$3.5 billion (USDA 1974), though \$500 million is the figure most often quoted (Ebeling 1968). Annual national losses were estimated to be \$17 million for damage by Lyctidae (Gerberg 1957) and \$40 million for all beetles (Hatfield 1950).

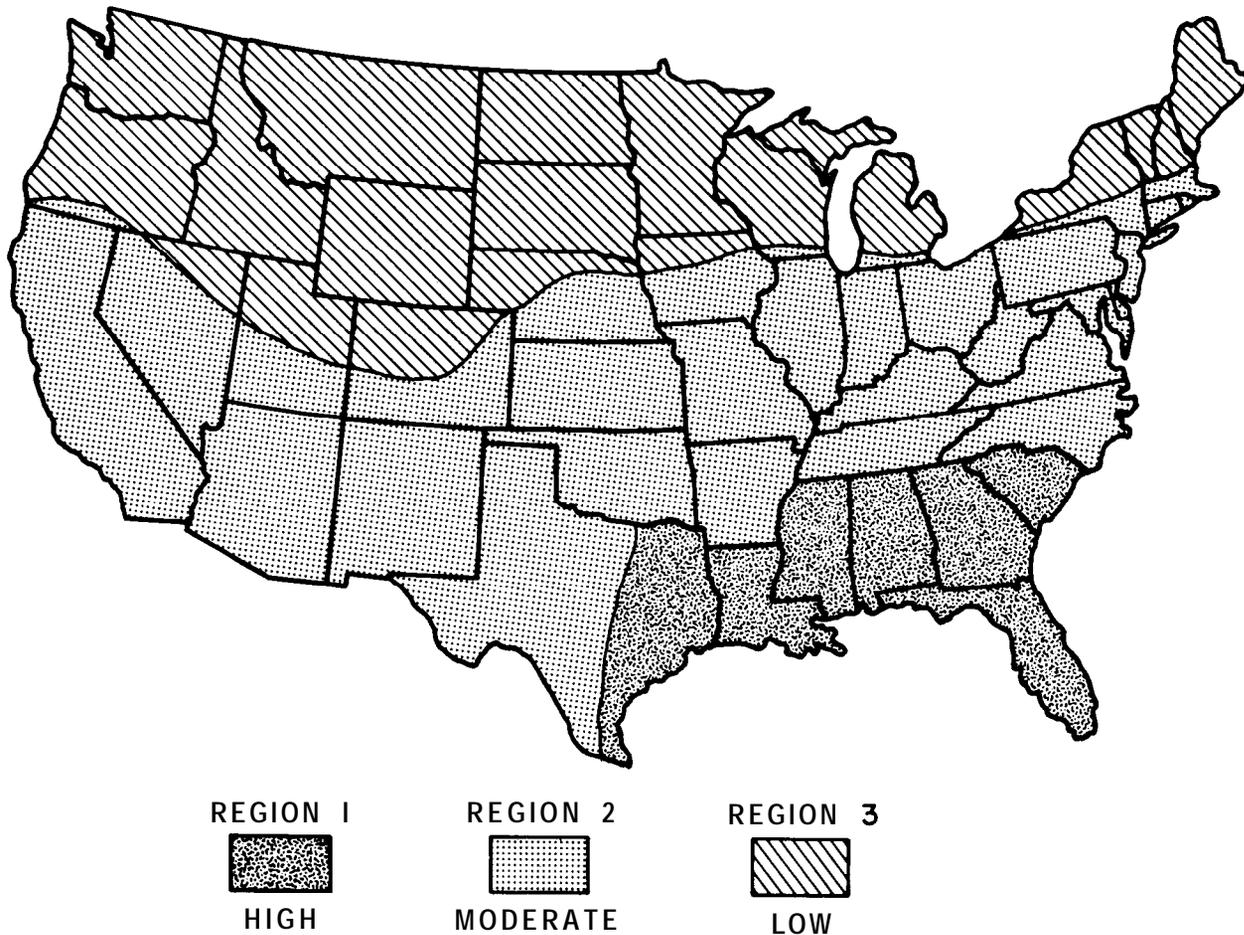
For about 23 years, soil beneath houses has been treated with chlorinated hydrocarbon insecticides currently recommended for termite prevention and control (Smith and others 1972). Many treatments have been done and many houses have been built since Snyder's 1961 estimate of \$250 million in damage annually to the nation's buildings was incorporated into the \$500 million loss estimate (Ebeling

1968). Therefore, we think the total cost of controlling termites and repairing their damage needs to be reevaluated.

For the 11 southern States either in the high-hazard area for termites or bordering it (fig.1), this paper presents estimated numbers of WPI treatments during 1970 and their total cost in 1976 dollars. To document the basis for these estimates, we report and discuss 1962 and 1967 data on types of treatments (composition), damage repairs, and treatment costs in Arkansas, Georgia, and Tennessee; data on numbers of WPI treatments done annually from 1961-76 in these States and three additional ones; and data on numbers, value, and construction types of houses from the 1960 and 1970 census of housing.¹ Trends in treatment costs, treatment performance, and housing construction are discussed.

¹Number and median value of houses for each State were obtained from the HC(1)-B Series, Table 34, Detailed Housing Characteristics, U.S. Department of Commerce, Bureau of Census, 1972. The other housing data were obtained from the U.S. Summary, U.S. Census of Housing, HC(1) No. 1, Tables 5 and 7, 1963, and from the U.S. Summary, Detailed Housing Characteristics, HC(1)-B1, Tables 22 and 23, 1972.

Figure 1.— Geographical distribution of subterranean termite hazard regions.



Methods

Data Gathered from States

Preliminary evaluation of reports and records from 18 States with structural pest control (SPC) laws revealed that only certain States had files containing sufficient information to use effectively in a survey. And other than for compiling yearly totals of treatments, available information had never been evaluated nor had comparisons been made among States. We obtained the number of treatments done annually from 1961-76 in Alabama, Arkansas, Georgia, Louisiana, Oklahoma, and Tennessee.

Because Arkansas, Georgia, and Tennessee records contained the most details on treatments, we obtained from these States sample data on treatment costs and composition, that is, whether the treatments were remedial or preventive for termites, beetles, or both insects combined.

In Arkansas, the record files contain every termite and beetle treatment contract, and the recorded data

included: (1) date of treatment, (2) county, (3) type of framework, (4) type of wood-destroying organism, (5) extent of treatment, including installation of soil covers to reduce relative humidity in crawl spaces, (6) type of repairs, (7) cost of treatment and repairs, and (8) renewal contract costs. In Georgia and Tennessee, the files contain only monthly reports or work orders, so limited information was available on construction characteristics or repairs performed. Cost information was available in Tennessee but not in Georgia.

To determine trends in the treatments performed during the 1960's, in 1969 we recorded data for all treatments reported during 1962 and 1967 by every fourth pest control firm in Arkansas, Georgia, and Tennessee. The firms were selected from an alphabetical listing of all firms licensed for SPC in each State for each year. Overall, sample data were recorded from 32,639 of the total 160,438 treatments performed by 913 licensed firms. Data accuracy was verified by personal inspection of about 70 randomly

selected homes in Arkansas and Georgia, and proved to be 87 to 100 percent correct.

How Estimates Were Made

Data were compiled and expanded for each State and year. For example, a Statewide estimate of the number of termite pretreatments for Arkansas in 1962, (X) was obtained by solving the proportion: number of pretreatments in recorded sample (447) is to the total number of termite treatments in the recorded sample (4,481) as X is to the constant 10,296, the total number of treatments reported in the State during 1962.

For the 1970 estimates, we calculated the percentage of houses treated in Alabama, Arkansas, Georgia, Louisiana, Oklahoma, and Tennessee by using the number of treatments reported in each State and the number of single-family dwellings in each State, as reported by the 1970 census. We estimated treatments for Florida, Mississippi, North Carolina, South Carolina, and Texas by applying the calculated treatment percentage for the other six States combined (2.73 percent) to the number of houses in each remaining State.

To estimate total cost in 1970, we first calculated

how many treatments were remedial or preventive in each State by using the mean of 1967 composition data for Arkansas, Georgia, and Tennessee. We then estimated cost by multiplying the estimated number of remedial and pretreatments in each State by mean cost for such treatments in Arkansas and Tennessee.

Because State regulatory officials estimated most contracts were renewed for 5 years, we estimated renewal cost in 1970 on the basis of treatments performed in the preceding 5 years. We estimated total treatments and treatment composition in each State for 1965-69 by the same procedures used for obtaining the 1970 estimate. We found what percentage of the houses had been treated during 5 years in the six States with treatment reports, then used this percentage (12.73) to estimate treatments in the five remaining States. Regulatory officials estimated that 37 percent of the pretreatments and 67 percent of the remedial treatments are renewed, so we used these percentages to estimate the number of each type renewed. We then multiplied these estimates by the average renewal cost obtained from the Arkansas and Tennessee data.

Because 19 construction cost indexes suggested

Table 1. — *Composition and incidence of WPI treatments in Arkansas, Georgia, and Tennessee*

Data characteristics	Arkansas		Georgia		Tennessee		Total 1967 data only ¹
	1962	1967	1962	1967	1962	1967	
	-----Number-----						
Houses in State ²	603,796	655,675	1,229,269	1,407,333	1,126,672	1,254,468	—
Licensed SPC firms	107	107	182	231	137	149	487
Total treatments	10,296	13,759	28,793	44,621	29,112	33,857	92,237
WPI treatment composition							
Remedial termites	8,066	7,669	21,737	24,671	23,798	26,020	58,360
Pretreatment termites	1,027	4,472	3,442	14,359	2,524	4,063	22,894
Remedial termites and beetles	703	1,248	1,850	3,507	2,466 ³	3,114 ³	7,869
Remedial beetles	172	162	600	1,413	—	—	1,575
Totals	9,968	13,551	27,629	43,950	28,788	33,197	90,698
	-----Percent-----						
Remedial termites	82.3	57.3	77.7	57.2	82.7	78.4	64.3
Pretreatment termites	10.5	33.4	12.3	33.3	8.8	12.2	26.3
Remedial termites and beetles	7.2	9.3	9.9	9.4	8.6	9.4	9.4
Remedial beetles	1.7	1.2	2.1	3.2	—	—	2.2
WPI treatment incidence for total houses							
Remedial termites	1.3	1.2	1.8	1.7	2.3	2.3	1.7
Pretreatment termites	0.2	0.7	0.3	1.0	0.2	0.3	0.7
Remedial termites and beetles	0.1	0.2	0.2	0.3	0.2	0.2	0.2
Remedial beetles	<0.1	0.1	0.1	0.1	—	—	<0.1

¹The mean percentages were used for the 1970 estimates.

²Twice the annual increase in houses from 1960-70 was added to the 1960 total for 1962 and subtracted from the 1970 total for 1967

³Calculated from Arkansas and Georgia data.

1967 costs had increased from 86 to 124 percent (Levy 1977), we adjusted all 1967 mean treatment costs 100 percent for inflation. Renewal charges for annual inspection contracts, however, were only inflated 80 percent because we believed their cost was established during treatments in prior years and thus affected less by inflation.

Procedures for estimating beetle treatments are described by Williams and Smythe (1978).

Results And Discussion

Treatment Incidence, Composition, and Cost for Arkansas, Georgia, and Tennessee

The total number of WPI treatments in the three States increased 35 percent from 1962-67 (table 1). There were more treatments in 1967 than in 1962,

primarily because of more termite pretreatments. In 1962, pretreatments were about 10.5 percent of all treatments, but by 1967 they were 26.3 percent. Remedial termite treatments increased only slightly.

Although the total number of treatments and total cost increased in Arkansas and Tennessee from 1962-67, the cost per treatment was less (table 2). Mean treatment cost was reduced more in Arkansas than in Tennessee, probably because more low-cost pretreatments were done in Arkansas.

With the extensive Arkansas data, we evaluated how repairs performed by the SPC industry affected remedial treatment costs (table 3). Fewer treatments included repairs in 1967 than in 1962, but the mean cost remained the same. For 69 percent of all treatments in 1962 and 70 percent in 1967, the cost was for the treatment itself and not repair of damages; the

Table 2. — *WPI treatment costs in Arkansas and Tennessee*

Cost for each type of treatment	Arkansas		Tennessee		1967 mean for all data combined ¹
	1962	1967	1962	1967	
Pretreatment termites					
Total	\$ 58,352	\$ 270,124	\$ 130,045	\$ 322,386	
Mean	58	59	57	60	60-(120)
Remedial termites only					
Total	1,251,845	1,083,568	3,361,900	3,339,280	
Mean	155	142	128	115	123-(246)
Remedial termites and beetles					
Total	141,314	269,359	5,597	46,393	
Mean	201	217	124	146	207-(414)
Remedial beetles only					
Total	20,870	16,514	4,885	1,014	
Mean	124	121	143	150	122-(244)
All treatments ²					
Total	\$1,496,883	\$1,691,630	\$3,618,066	\$3,792,716	
Mean	14.5	12.3	12.4	11.1	11.4-(228)

¹The figures enclosed by parentheses are 1967 costs inflated 100 percent to 1976 dollars.

²Includes miscellaneous treatments in addition to those listed.

Table 3. — *Remedial termite treatments in Arkansas in relation to damage repair*

Repair performance	Percent of all remedial treatments		Average treatment cost (dollars)	
	1962	1967	1962	1967
Not needed	68.7	69.6	131	132
Needed, not done	10.0	18.7	164	175
Done	16.8	9.8	223	230
Some done, more needed	2.9	1.8	228	317
Miscellaneous ¹	1.6	0.1	—	—
Weighted mean			153	153

¹Treatments such as repairs and enclosing crawl space, no repairs and enclosure, spot treatment, or recall. Each category was less than 1.0 percent of the total number of remedial treatments which were 9,194 and 9,058 in 1962 and 1967, respectively.

Tennessee data also suggested this. Based on the difference in cost of treatment with and without complete repair done, repairs averaged \$92 in 1962 and \$98 in 1967. For 2 to 3 percent of the treatments, about \$100 to \$200 in repairs was done, but we had no way to determine the additional cost if all damage had been repaired. Extensive damage repair probably was needed with some but not necessarily all of the remaining 10 to 19 percent of the treatments. Although repairing termite damage to a home can cost thousands of dollars, most Arkansas homeowners apparently obtained effective control soon after termite infestations were noticed.

The potential cost of termite damage is rising with costs of materials and labor, but extensive damage probably occurs less frequently now because termite prevention and control treatments have become widely used through FHA and VA policies (Anon 1959) and the publicity efforts of the SPC industry. Surely, development of better equipment and treatment procedures during the past two decades has improved termite prevention and control services. However, houses continue to be designed and built with construction faults conducive to termite attack, many houses are not pretreated, and some are pretreated inadequately (Mountain 1977).

We think most homeowners, as Arkansas homeowners have done, obtain termite control services soon after detecting termite attacks, so damage repair expenditures should be kept to a minimum. Each year a few houses are partially treated to correct earlier improper remedial treatment, improper pretreatment, or disturbance of proper treatment by landscaping or remodeling. Therefore, we believe a mean remedial treatment cost that includes some allowance for damage repair and some allowance for partial retreatment of previously treated houses accurately represents current remedial control practices.

Reported WPI Treatments and Their Incidence for Six Southern States

For treatments reported during 1970, the percentage of houses treated varied from 1.1 percent in Oklahoma to 3.8 percent in Georgia, and means of treatments done during 1961-70 and during 1971-76 are much higher in some States than in others (table 4). Factors causing such trends include differences in termite incidence and State population growth rates. Numbers of treatments reported within a State fluctuate from year to year because of such factors as whether the year was good or bad for termite swarming or whether high construction activity increased numbers of pretreatments.

Although our data suggest more than 4 percent of the houses may have been treated in Georgia during some years since 1970, this percentage apparently is about the upper limit of treatment performance for a State like Georgia, which is heavily populated and in the high-hazard region. With the possible exception of Florida, more than 4 percent of the houses probably are not treated in any year in any of the 11 States. Unfortunately, Florida does not require reports of SPC treatments, so the exact level there cannot be determined.

If treatment activity remained at 3 percent of the houses every year for 20 years, 60 percent of all houses should have been treated, but many less probably were. If we compare the increase in numbers of houses from 1960 to 1970 with number of WPI treatments in six States, we see that many houses built during the 1960's were not pretreated (table 5). Some WPI treatments were retreatments; some were for beetles; and because some houses were demolished more houses were built than suggested by the increases. Assuming 1962 and 1967 are representative for the decade, less than 35 percent of new houses were pretreated in Arkansas and Georgia and less

Table 4.—WPI treatments reported in six States during 1970 and mean numbers reported during 1961-70 and 1971-76

Period	Alabama	Arkansas	Georgia	Louisiana	Oklahoma	Tennessee
	-----Number-----					
1970	35,815	16,250	55,291	27,000	10,297	38,232
1961-70 ^x	29,490	13,758	44,218	23,080	14,637	33,876
1971-76 ^x	42,612	24,071	69,718	31,151	17,711	43,079
	-----Percentage of houses treated-----					
1970	3.2	2.4	3.8	2.4	1.1	2.9
1961-70 ^{x1}	2.8	2.2	3.3	2.2	1.7	2.8
1971-76 ^{x2}	3.8	3.8	4.7	2.7	1.9	3.3

¹The percentages shown are based on the mean of the number of houses reported for the 1960 and 1970 census in each State.

²These percentages, based on 1970 houses, are higher than the actual levels of treatments done because some treatments were retreatments of previously treated houses and some were pretreatments of new houses built since 1970.

Table 5.— Comparison of the increase in houses from 1960-70, reported WPI treatments, and estimated pretreatments in six States

State	Increase in houses from 1960-70	Reported treatments	Estimated pretreatments ¹
Alabama	147,328	331,696	12,641
Arkansas	86,463	137,581	30,130
Georgia	296,712	442,181	102,586
Louisiana	167,680	230,779	50,540
Oklahoma	122,179	146,164	15,347
Tennessee	212,660	329,637	34,611
Total	1,033,082	1,618,038	305,855

¹Pretreatments in Alabama, Arkansas, and Louisiana are estimated as 21.9 percent from 1967 data in Arkansas; number in Georgia as 23.2 percent from 1967 data in Georgia; and number in Oklahoma and Tennessee as 10.5 percent from 1967 data in Tennessee.

than 17 percent in Tennessee.

Treatment numbers increased markedly from 1961-72 then decreased, probably because of the recession in housing construction (fig. 2). The increase since 1974 suggests more pretreatments are now being done.

Estimates of Southwide WPI Treatments

In table 6, termite treatments for 1970 and WPI treatments for 1965-69 are the number reported in six States and estimates for the remaining States. In all States, however, the composition of termite treatments is estimated as the same as the mean 1967

composition for Arkansas, Georgia, and Tennessee except that remedial treatments for termites treated alone have been combined with those for termites and beetles.

Most termite prevention or control treatments include a warranty or insurance for future damage, provided an inspection contract is purchased annually. For example, over 2 million termite treatments were done in the 11 States from 1965-69, and an estimated 1.2 million were renewed annually (table 6). Most were remedial treatments with the annual inspection charge often being a percentage of the initial treatment cost.

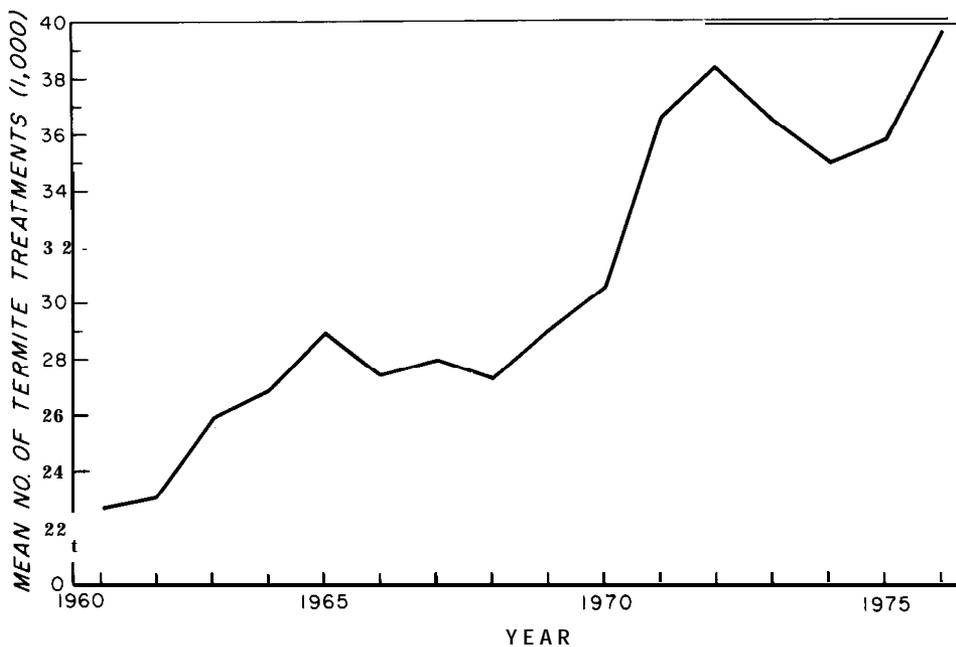


Figure 2.— Trend in numbers of treatments annually reported to regulatory offices in Alabama, Arkansas, Georgia, Louisiana, Oklahoma, and Tennessee during 1961-76.

Table 6. — *Estimated number of remedial or pretreatments for termites in 1970, WPI treatments for 1965-69, and estimated number of contracts renewed annually in 11 southern states*

State'	Houses in 1970	Termite remedial treatments	Termite pretreatments	WPI treatments 1965-69	WPI contract guarantees renewed*
Alabama	1,114,845	26,389	9,426	167,476*	99,145
Arkansas	672,967	11,831	4,227	75,852*	44,904
Florida	2,490,838	50,101	17,899	316,835	187,567
Georgia	1,466,687	39,447	14,091	231,517*	137,058
Louisiana	1,146,105	19,894	7,106	122,380*	72,449
Mississippi	697,271	14,025	5,010	88,693	52,506
North Carolina	1,619,548	32,577	11,637	206,006	121,955
Oklahoma	937,815	7,587	2,710	74,804*	44,284
South Carolina	804,858	16,190	5,783	102,378	60,608
Tennessee	1,297,000	28,169	10,063	171,825*	101,720
Texas	3,809,086	76,618	27,370	484,516	286,833
Total	16,057,020	322,828	115,322	2,042,282	1,209,029

'Sums of reported treatments in States asterisked were 2.73 percent for termite treatments in 1970 and 12.73 percent for total WPI treatments of all houses in the six States from 1965-69. To estimate treatments in each of the five remaining States we applied these percentages to number of houses in 1970 in each State.

*Twenty-six percent of the treatments were considered pretreatments and about 37 percent of these were renewed. Estimated 67 percent of the remedial treatments were renewed. Percentages of renewal are estimates of regulatory officials.

Estimates of Treatment and Renewal Costs

The combined total cost of WPI treatments in 1970 for the 11 States is \$143.1 million when inflated 100 percent to 1976 dollars (table 7). Figure 3a shows the composition of WPI treatments when termites and beetles could be treated with the same insecticides.

Now, however, termites and beetles must be treated separately. Figure 3b shows the 1970 composition if each treatment of beetles and termites together is considered as two separate treatments. Remedial beetle control becomes 10.8 percent of all treatments and 9.0 percent of total monetary loss (fig.4). Termite pretreatments represent 13.5 percent

of all treatments, but because they are inexpensive, they make up only 9.7 percent of the total monetary loss. Contract renewal charges are 25.8 percent of the total loss estimate for WPI and 28.4 percent of that for termites.

We believe the \$130.2 million loss estimate for termites reasonably represents losses in single-family dwellings. Our means for pretreatment and contract renewal — \$60 and \$17 — compare favorably with the 1970 National Pest Control Association (NPCA) means- \$63.79 and \$18.76 (renewal of remedial) or \$18.07 (renewal of pretreatment), but our estimates suggest that fewer contracts were renewed than

Table 7. — *Estimated costs of wood-destroying insect treatments in 1970, adjusted 100 percent inflation to 1976 dollars*

State	Termite remedial treatments	Termite pretreatments	Beetle remedial treatments	Renewal contracts	Total for all costs
	t h e n e d , o f d o l l a r s -----				
Alabama	6,492	1,131	1,119	3,034	11,776
Arkansas	2,910	507	414	1,374	5,205
Florida	12,325	2,148	1,908	5,740	22,121
Georgia	9,704	1,691	1,653	4,194	17,242
Louisiana	4,894	853	921	2,217	8,885
Mississippi	3,450	601	659	1,607	6,317
North Carolina	8,014	1,396	1,415	3,732	14,557
Oklahoma	1,866	325	274	1,355	3,820
South Carolina	3,983	694	752	1,855	7,284
Tennessee	6,930	1,208	919	3,113	12,170
Texas	18,848	3,284	2,869	8,777	33,778
Total	79,416	13,838	12,903	36,998	143,155

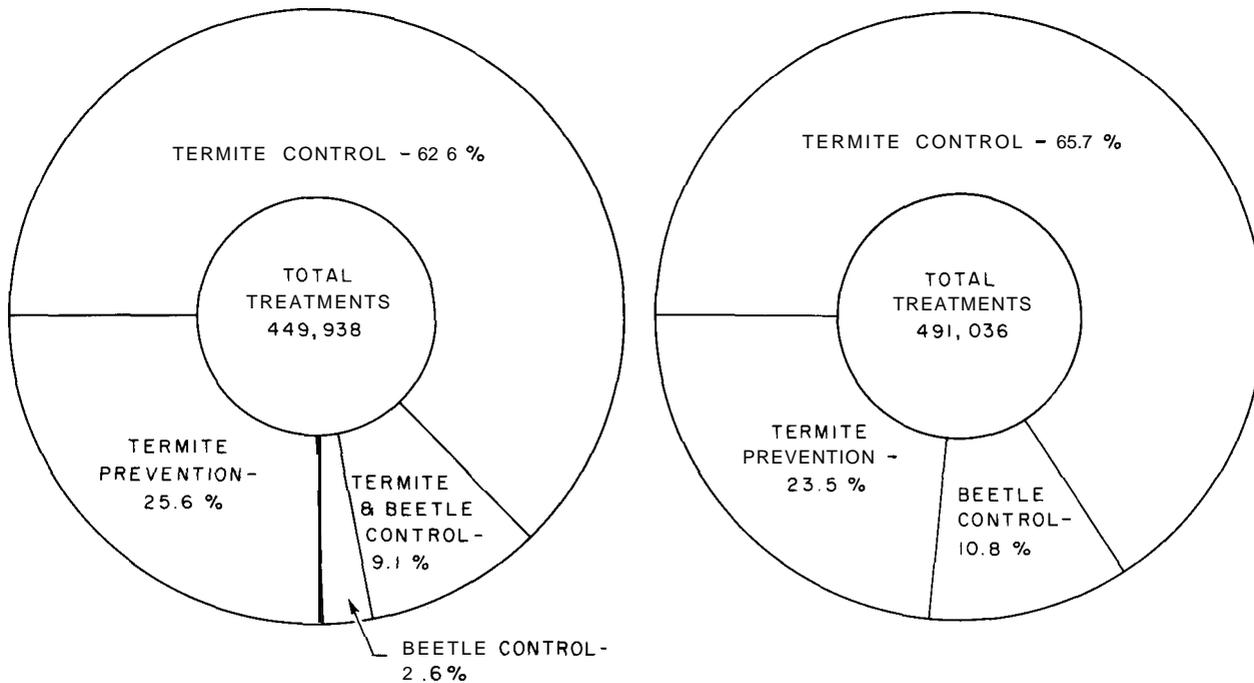


Figure 3. -Percent composition of total WPI treatments in 1970: (a) when the same insecticides were used for treating termites and beetles, and (b) now when each must be treated separately.

NPCA estimated.* We can assume that more pre-treatments are being done now than in the years our samples were taken. And because our estimates are based on 1967 composition, our 1970 estimates may be slightly low. The trend toward more pretreatments should reduce the number of costly remedial treatments needed.

Because of variations in construction characteristics, labor costs, and extent of repairs, remedial treatment cost and damage repair expenses are portions of total losses most difficult to estimate accurately. Remedial control cost estimates for the 11 States are: \$79.4 million with the \$246 mean of 1967 remedial treatment costs from Arkansas and Tennessee inflated 100 percent; \$91.7 million with the \$284 mean of 280,510 treatments performed during 1977 throughout the nation;³ or \$98.9 million with the 1967 mean remedial cost in Arkansas inflated 100 percent (table 3).

Because we lack data on the present composition of treatments and performance of repairs, we think the \$79.4 million estimate is preferable because it was derived with a mean that represents some damage repair expense and includes some low-cost partial treatments. Though arbitrarily inflated and derived from data for only two southern States, the \$246 mean does represent over 6000 sample treatments by about 250 SPC firms, and it was selected after evalu-

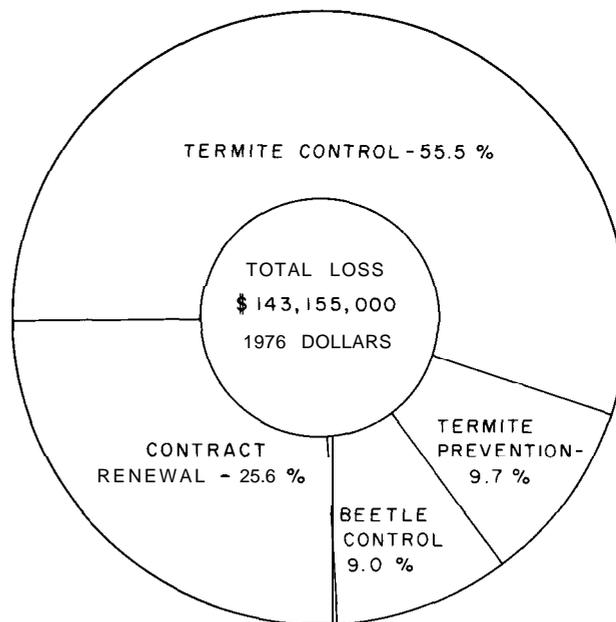


Figure 4. — Type of WPI treatment and percent that each (including contract renewal) contributed to total loss in 1970.

*National Pest Control Association correspondence, from: NPCA Staff, To: Marketing Management Committee, Wood Destroying Organisms Committee, Subject: Termite Survey Results, dated January 22, 1970.

³Correspondence dated June 14, 1978, from Dr. Philip J. Spear, Senior Director, Research National Pest Control Association, to Lonnie H. Williams.

ation of repairs performed with over 2000 treatments.

For expenses of damage repair done by someone other than the SPC industry, we derived an estimate of \$38.6 million by applying the repair performance percentages in Arkansas (table 3) to the 322,828 remedial treatments in the 11 States during 1970. Our estimate assumes 70 percent required no repairs, 10 percent required repairs costing \$196 per treatment (adjusted for inflation), and the remainder presumably cost \$500 each in repairs.

Our loss estimates (fig. 4) would be increased significantly by adding losses to multifamily dwellings, commercial establishments, public buildings, buildings maintained by the military, and by some allowance for costs of preserving poles, pilings, and posts. Many houses have been built since 1970 and more treatments are now being done, but because a greater proportion of treatments performed now probably are low-cost pretreatments, the total loss has not necessarily increased. Changes in construction also may influence losses. From 1960-70 in the 11 States, the number of houses built on concrete slabs or with basements increased 14.8 percent and 2.1 percent respectively. Remedial treatment costs will be high for such construction because applying insecticides beneath existing slabs or basements is difficult.

We have contributed toward documenting termite-caused losses in the region where hazard is greatest, but documenting national loss estimates and showing differences by hazard region require data on treatment incidence, composition, and costs for Hawaii, for some of the 14 States in Region 3 and for some of the 23 remaining States in Region 2 (fig. 1). In 1970, there were about 15.3 million single-family dwellings in Region 3 and about 36 million in Region 2, but treatment totals by State were only available in California and Kentucky (Smythe and Williams 1974), though Kansas has made survey estimates."

For 1970 in the 11 States, the median value of single-family dwellings ranged from \$6.2 billion in Arkansas to \$46.5 billion in Texas and totaled over \$200 billion. Because the 1970 median value of \$17,000 had risen to \$27,200 by 1974 and because houses built since 1970 have an estimated median value of \$36,300 (Myrtle 1976), the total value now exceeds \$400 billion. Use of effective controls has reduced estimated termite-caused losses to much less than 0.1 percent of the total housing value. However,

our estimates suggest nearly 8.5 times more money is being spent on remedial control and damage repair than on prevention. Because a median valued house can be protected through pretreatment for less than 0.5 percent of its value, we believe expanded research application efforts would reduce losses further.

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Estimates based on data from State regulatory agencies suggest owners of single-family dwellings in 11 southern States spent about \$143 million (1976 dollars) in 1970 to control subterranean termites and wood-destroying beetles. Losses incorporated into this estimate include: \$79.4 million for remedial termite treatments, \$13.8 million for pretreatment for termites, \$12.9 million for remedial beetle treatments, and \$37.0 million for contract renewals.



