THE LOW VALUED RISK
A STUDY OF THE PREMIUM REQUIRED FOR HABITATIONAL RISKS OF VARIOUS POLICY AMOUNTS

BY

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INTRODUCTION

When the All-Industry Bills were adopted in 1946, Multi-Peril Package Policies, particularly the Homeowners Policy, had not been conceived. It is understandable, therefore, that certain phraseology of the All-Industry Bills was not readily adaptable to changing conditions and philosophies which were subsequently dictated by the introduction of package policies. Of particular significance is the possible variation in interpretation of the phrase ". . . kind of insurance, or class of risk within a kind of insurance, or combination thereof."

In a broad sense, this paper is concerned with the effect of the above two events on the operation of a multi-line fire and casualty company, that is, first, the effect that the Homeowners has had on the Fire and Allied Lines business of a particular company and, secondly, the ramifications of various interpretations of the meaning of ". . . kind of insurance, or class of risks within a kind of insurance, or combination thereof". Of particular significance is the question of variation in expense by "class of risk" and the extent to which such variation should be allowed in the administration of the various state rating laws.

Effect of Homeowners on Remaining Fire and Allied Lines Business: The possible effect of the Homeowners on the remaining Fire and Allied Lines business of a particular company includes:

1. Change in quality and type of dwelling business remaining in the Fire and Allied Lines category.
2. A shift in the ratio of dwelling to commercial or specifically rated risks in the Fire and Allied Lines category.
3. The effect of these changes (i.e., 1 and 2 above) on the expense and loss portion of the Fire and Allied Lines premium dollar.

The change in the quality or type of dwelling business remaining in the Fire and Allied Lines category should be obvious. In many states the cost of the Homeowners is less than comparable amounts of coverage for fire and extended coverage.[1] This means that very little "selling" is required for those dwellings eligible for a Homeowners Policy.

[1] In Minnesota, for example, the 3 year premium for a $10,000 Form 1 Homeowners in a Class 1-6 town is $77.00. The premium for Fire and Extended Coverage for the same amount of insurance ($10,000 on building and $4,000 on contents) is $93.40. The author made an extensive review of this premium differential situation in May of 1961. At that time the Homeowners premium for Form 1 was less than the equivalent Fire and EC premium in 10 states for all policy amounts and in 12 other states the Homeowners premium was less when the policy amount exceeded $14,000 ($10,000 building, $4,000 contents). Since this analysis was made, some 25 states have reduced Homeowners rates and this rate differential in favor of the Homeowners probably exists in even more states.

Also, the higher valued dwellings are generally owned by persons who are more in need of liability and theft coverages and thus the Homeowners is a very natural type of package policy for such individuals.

The result is that all dwellings having an insurable value of less than $8,000 (the minimum Homeowners eligibility requirement is $8,000) and some other dwellings in the low valued category which are less desirable from an underwriting viewpoint (i.e., substandard in construction, located in undesirable neighborhoods or owner having possible moral hazard) have remained in the Fire and Allied Lines category and the better, higher valued dwelling risks have been transferred to the Homeowners class.

Trend in Volume and Loss Experience: Experience reported by the stock fire insurance companies to the National Board of Fire Underwriters during the period 1956-1960 shows the total fire premium for Habitational lines written in 1960 was some 48 million dollars less than the premium written in 1956 (See Exhibit 1). During this same period, the written-paid loss ratio for fire coverage on Habitational risks has increased from 50.9% to 60.0%, indicating the effect the transition of the better dwelling business to the Homeowners class has had on the remaining fire insurance in the Habitational classes. During this same period, the written-paid loss ratio for fire coverage for other than Habitational risks has improved. This loss ratio was 49.7% in 1956 and 45.8% in 1960.

The transition to the Homeowners class of a large block of dwelling business has also resulted in a change in the distribution of the "book" of Fire and Allied Lines coverage for most companies.

Exhibit 2 shows the trend in Fire, Extended Coverage and Homeowners premiums for the ten years 1951-1960. In this period, total premium (other than Life) increased more than 5 billion dollars, yet Fire premiums have increased only 87 million dollars, Extended Coverage premiums increased 167 million dollars, whereas Homeowners premiums have gone from zero to in excess of 600 million dollars in 1960. The 1960 Homeowners premiums represented 5.86% of the total written premium compared to 13.18% for Fire and 4.56% for Extended Coverage.

Of even greater interest is the change in distribution of Fire premiums by class in the five year period 1956-1960. In 1956 the Habitational classes (see Exhibit 1 for a list of classes involved) represented 42% of the total Fire premium; whereas in 1960 this group represented only 36%. Furthermore, within the Habitational Group, several marked changes in distribution have occurred. Class 009—Household Contents in Dwelling, has decreased 15 million dollars and Class 029—Dwelling Building Only, has decreased 50 million dollars and Class 019—Dwelling Buildings and Contents, has increased only 3 million dollars in this five year period. The net change in dwelling building and/or contents classes is thus a decrease in premium of 62 million dollars.

Change in Fire and Allied Lines Experience: The effect of these changes on the expense and loss portion of the Fire and Allied Lines premium dollar have been of considerable concern to the author for a number of years. The significance of the various changes will vary by company, depending on their "book" of business. In our case, we have been engaged in the personal lines market to a very heavy extent—Habitational lines representing 81.6% of our

total Fire and Allied Lines "book" in 1960. In this same year, those stock companies reporting their experience to the National Board of Fire Underwriters had only 39.9% of their total Fire and Allied Lines premiums in the Habitational Group.

Like many other companies who wrote a large proportion of Habitational lines, the period 1956-1960 saw our Fire and Allied Lines business levelling off as a result of the heavy influx of Homeowners writings. Although this was to be expected, our concern has been directed to the effect this transition has had on our Fire and Allied Lines expense ratio.

During the period 1956-1960 the average industry expense ratio, as reported by Best, decreased from 45.5% in 1956 to an estimated 44.3% in 1960 for Fire, and decreased from 46.3% in 1956 to an estimated 45.3% in 1960 for Extended Coverage. During this same period our underwriting ratio for all lines decreased, thus following the general trend in the industry. During this same period, however, our Fire and Allied Lines expense ratio increased several percentage points.

This unfavorable trend in our Fire and Allied Lines expense ratio appeared to be the result of two factors:

1. The transition of the better dwelling business to the Homeowners class was leaving the less desirable and lower premium dwelling business in the Fire and Allied Lines class.
2. The high ratio of Habitational business in the Fire and Allied Lines category (81.6% as compared to an industry average of 39.9%) indicated that our average premiums for Fire and Allied Lines were lower than the industry average.

Although our combined ratio for Fire and Allied Lines was favorable, the unfavorable expense trend was of particular concern because in certain states great weight is given to expense as the only means of justifying a deviation.[2]

STUDY OF PREMIUM REQUIRED FOR HABITATIONAL RISKS

As a result of all these factors, the author undertook to determine the required premium for Habitational risks (Fire and Allied Lines only, excluding Homeowners) by various policy amounts. The decision to concentrate our study on Habitational risks was made on the basis that we were writing very little commercial business and, further, that such commercial business developed premiums of sufficient size which, in themselves, should not be the cause of an unfavorable expense situation.

Basic Data Available: As a basis for this study, we had available four years experience (1957-1960) of Fire and Allied Lines by nine policy amount groups, as follows:

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[2] The New York Insurance Department, for example, uses the following formula: For Fire Insurance: Expense 47.1%, Loses 46.9%, Profit 6.0%. For Extended Coverage: Expense 56.3%, Losses 37.6%, Profit 6.0%. A company is generally required to justify a lower expense ratio for a deviation. For example, with a 10% deviation for Fire, the allowance for losses becomes 52.1% (46.9% ÷ 90%), profit 6.0%, leaving an allowable expense ratio of 41.9%.

Policy Amount Group	Policy Amount Range
1	$ 0 - $ 2,500
2	$ 2,501 - $ 5,000
3	$ 5,001 - $ 10,000
4	$ 10,001 - $ 25,000
5	$ 25,001 - $ 50,000
6	$ 50,001 - $100,000
7	$100,001 - $200,000
8	$200,001 - $300,000
9	$300,001 and Over

Data consisted of premiums written, number of risks, losses paid and number of losses. This data, however, was lacking in several respects as follows:

1. The experience was not broken down by occupancy class.
2. Data was lacking for what we considered to be a crucial area in terms of policy amount of about $7,500 - $8,000. ($8,000 is the Homeowners eligibility requirement amount.)
3. Definite figures were not available which would make it possible to determine the actual average policy amount in each group. (We could only assume the midpoint of the range and this would be very unsatisfactory for the range 0 - $2,500).

Additional Data Obtained: As a result, we obtained more definite information for all Fire and Allied Lines business during a 10 day period on a countrywide basis. A total of 11,203 policies were recorded during this period which gave us a reasonable sampling to serve as a basis for further statistical analysis.

To check the validity of the 10 day survey results, we compared the average premium for the year 1960 by amount group, which was available from the original statistical data, with the average premium for the 10 day survey, with the following results:

Policy Amount Group	Policy Amount Range	Average Premium 1960 Experience	Average Premium Survey Experience
1	$ 0 - $ 2,500	$ 19.42	$ 19.53
2	$ 2,501 - $ 5,000	25.38	25.45
3A	$ 5,001 - $ 7,500	42.17	37.56
3B	$ 7,501 - $ 10,000	42.17	51.69
4	$10,001 - $ 25,000	65.60	67.47
5	$25,001 - $ 50,000	177.89	177.53
6	$50,001 - $100,000	301.09	342.56

It will be noted that the survey enabled us to obtain the average premium for the range $5,001 - $7,500 and $7,501 - $10,000; whereas the original data gave us a single average premium for the range $5,001 - $10,000. We have already pointed out the significance of obtaining this further breakdown.

The average premiums checked very closely with the exception of the last group $50,001 - $100,000. Since most of the business in this range is in the mercantile class, we were not too concerned with the apparent discrepancy between the 1960 figure of $301.09 and the 10 day survey figure of $342.56. In this policy amount group our 10 day survey produced only 34 policies and thus data was of very limited credibility. The survey produced no risks in policy amount groups 7, 8 and 9 (policy amounts above $100,000), but this area was of no particular concern as regards our study of Habitational risks. Future discussion will, therefore, be concerned with the first six policy amount groups or risks having insurable values up to $100,000.

The survey also gave us data with respect to the average policy size within each policy amount group. These results were as follows:

Policy Amount Group	Policy Amount Range	Average Policy Amount
1	$ 0 - $ 2,500	$ 2,420
2	$ 2,501 - $ 5,000	4,016
3A	$ 5,001 - $ 7,500	6,574
3B	$ 7,501 - $ 10,000	9,068
4	$10,001 - $ 25,000	14,554
5	$25,001 - $ 50,000	33,793
6	$50,001 - $100,000	70,316

The survey also gave us a breakdown of the average premium and average policy amount for various occupancy groupings. Exhibit 3 shows these results in detail.

Determination of Premium Needed for Expenses: With the necessary basic data at hand, we approached our goal of determining the required premium for Habitational risks by various policy amounts by dividing the needed premium into three components:

1. Fixed Expenses.
2. Variable Expenses.
3. Losses.

The first step was to determine the current distribution of expenses and losses for Fire and Allied Lines. We elected to use our five year average for 1956-1960 as follows:

Losses	41.9%
Loss Adjustment Expense	2.9%
Commissions	24.3%
Taxes	3.3%
Other Expenses	21.5%
Profit & Catastrophe	6.1%
Total	100.0%

The five year average was used for several reasons. First, it gave us a desirable distribution of expenses and losses with an allowance of 6.1% for profit

and catastrophe. Secondly, the actual five year loss ratio was used and this, of course, was preferable to using a single year's experience. As previously pointed out, the 1960 expense ratio was several percentage points higher than the five year average, but its use would have defeated our purpose of determining the required rates for various policy amounts and provide a reasonable margin for profit and catastrophe.

Commissions and Taxes are, of course, "variable expense" in that they vary with the premium. Other Expenses are both "variable" and "fixed". Part of this expense is fixed since the cost of issuing a policy, the premium collection expense and certain other expenses are the same regardless of the amount of premium involved.

The following process was used to arrive at the amount of "fixed" expense:

1. The "Other Expense" ratio of 21.5% (See above formula) was applied to the 1960 written premium for Fire and Allied Lines.
2. This dollar amount of "Other Expense" was divided by the total number of policies written in the same year (1960) which amounted to $8.51 per policy.
3. The distribution of our "fixed expenses" was established as follows:

Cost of issuing new & renewal policies	$3.32
Cost of issuing endorsements	$ .43
Collection Costs	$1.15
All other "fixed" costs[3]	$2.15
Total	$7.05

4. The $7.05 of "fixed" expense was converted to total dollars of expense by multiplying it by the number of policies issued during 1960 and the resulting total dollars were converted to a ratio of 17.8% by dividing by the total premium written during the same year.
5. The "fixed" other expense was thus 17.8% ($7.05 per policy) and the remaining "variable" other expense was 3.7% (21.5% minus 17.8% = 3.7%).
6. Our rating formula now becomes:

Losses	41.9%	
Loss Adjustment Expense	2.9%	
Commissions	24.3%	
Taxes	3.3%	
"Fixed" Other Expense	17.8%	($7.05 per policy)
"Variable" Other Expense	3.7%	
Profit & Catastrophe	6.1%	
Total	100.0%	

[3] In addition to Commissions and Taxes, other variable costs include advertising expense, boards and bureaus, surveys and allowances to managers. By subtracting all variable expenses from the total expenses for Fire and Allied Lines, we arrive at a total "fixed" expense of $7.05 per policy and a total "variable" expense of $1.46 per policy. The total average expense per policy for all "other expenses" is thus $7.05 plus $1.46 or $8.51 per policy.

It is thus apparent that by using a "fixed" expense of $7.05 per policy the actual "fixed" other expense ratio will vary from the average of 17.8% depending upon the actual size of the premium. For a low premium, the $7.05 will represent a much higher ratio than the average of 17.8%, and for a high premium the $7.05 will represent a lower ratio than the average of 17.8%.

Determination of Premium Need for Losses: The next step in our investigation was to determine the variation by policy size, if any, in the amount of premium required to pay losses. Using the four year statistical data for number of risks and amount of losses paid by average policy size and the average size of risk determined from the ten day survey, we computed the total liability and the "loss cost" on a written basis. Exhibit 4 shows these results.

The next step was to convert this written data to an "in-force basis" in order to determine how much premium is needed to pay losses for various policy amounts on an annual basis. We had available total average liability in-force for four years 1957-1960. Dividing the total amount of losses paid during this same four year period by the total liability in-force produces an average loss cost on an in-force basis for the period of 7.26 cents per one hundred dollars of insurance in-force.

The average loss cost on a written basis for the same four year period (losses paid divided by insurance written) was 11.84 cents per one hundred dollars of insurance written. To change the "written" loss cost for each policy amount group (See Exhibit 4) to an "in-force" basis, each "written" loss cost was multiplied by the ratio of the average loss cost on an "in-force" basis (7.26 cents) divided by the average loss cost of 11.84 cents on a "written" basis (ratio equals .613). These results are shown in Exhibit 5A.

The validity of this conversion is based on the assumption that the ratio of "written" liability to "in-force" liability is the same for each policy amount group. The basic statistical data on a written basis shows a fairly even distribution of business by year for each policy amount group, indicating that the error in making this assumption would be small.

The loss cost on an "in-force" basis multiplied by the average policy amount produces the annual premium required to pay losses for this size of policy. These results are shown in Exhibit 5B.

The original loss data used in determining the annual premium required to pay losses was for all Fire and Allied Lines. Even though the Habitational classes represented over 80% of our business, there existed the possibility that several large losses in the mercantile or other than Habitational classes might distort the loss data. We subsequently obtained similar basic data for the four years 1957-1960 for Habitational classes only. The results are shown in Exhibit 5C.

This data for Habitational classes (average policy size versus annual required premium to pay losses) was then plotted on a log-log scale. A number of trials had indicated that the relationship was in the form of a straight line on a log-log scale indicating an equation of the form $y = ax^b$. The resulting curve is shown in Exhibit 6. From this curve we determined the annual premium required to pay losses for various policy amounts from $1,000 to $100,000. (Graph paper 20″ x 24″ was actually used to insure reasonable accuracy.) The results are shown in Exhibit 7 and also shown are the loss costs. It will be noted that the loss cost varies from 11.7 cents per one hundred

dollars of insurance for a $1,000 policy to 3.95 cents per one hundred dollars of insurance for a $100,000 policy. This indicates clearly that the pure premium for losses is proportionately higher for the lower policy amounts.

Normal rating methods indicate that the premium available to pay losses for a $50,000 risk is fifty times as great as the premium available to pay losses for a $1,000 risk if both risks have been written at the same rate under the same occupancy classification. In other words, if the loss ratio for a certain class is 50%, it is generally assumed that 50% of the premium for each risk is required to pay losses regardless of policy size. These findings indicate that the ratio would be about 19.8 instead of 50 ($23.20 loss premium for a $50,000 risk versus a $1.17 premium for a $1,000 risk). Similarly, a $50,000 risk requires pure loss premium of only 5.8 times the required pure loss premium for a $5,000 risk ($23.20 versus $4.01), whereas the normal formula would indicate ten times as much premium would be required.

Various forms of Casualty insurance have long recognized this variation in pure loss premium (for example, increased liability limits), but it has not been recognized in Fire insurance prior to the introduction of the Loss Constant Dwelling Schedules which will be discussed later in this paper.[4]

Determination of Required Premium by Policy Amount: Having determined the premium required to pay for "fixed" other expenses, "variable" other expenses and losses, it is then possible to determine the required premium for any size of risk as follows:

Required Premium = Premium for Fixed Expense + Premium for Variable Expense + Premium for Losses

Or: $X = F + V + L$

Where: X = Required Premium (Annual)

F = Fixed Expense = $7.05 per policy

V = All Other Expenses, including allowance for Profit and Catastrophe = 40.3% of Final Required Premium[5]

L = Premium for Losses (from Exhibit 7)

Or: $X = \$7.05 + L + 40.3\%\ X$

Or: $$X = \frac{\$7.05 + L}{.597}$$

Using this formula we computed the required premium for various policy amounts from $1,000 to $100,000 and also the average rate for each policy amount and the results are shown in Exhibit 8.

Based on the average loss cost for all policy amounts of 7.26 cents per one hundred dollars of insurance in-force, the average rate required is 27.60 cents

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[4] Some recognition to a variation in the premium needed to pay for losses by policy amount has been made in the area of large risks insured under highly protected Risk Rating Plans. The deductible schedule of the Factory Mutual Rating Bureau recognizes a constant expense and a variable amount of loss, depending upon the relationship of the size of the risk to the amount of the deductible. The deductible filings of Chubb & Sons also recognize this differential.

[5] Reference to the basic formula on page 11 will indicate that the sum of loss adjustment expense, commissions, taxes, "variable" other expense and profit and catastrophe equals 40.3%.

per one hundred dollars of insurance. However, in order to obtain sufficient income to pay for all anticipated losses and expenses, a rate of 137.7 cents is needed for a $1,000 policy; whereas a rate of only 7.80 cents is needed for a $100,000 policy.

A comparison of the required premium with the actual premium received for the various policy amount groups produces some interesting results:

Policy Amount Group	Average Policy Amount	Required Annual Premium	Actual Annual Premium	Difference (+) or (−)
1	$ 2,420	$15.66	$ 10.07	— $ 5.59
2	4,016	17.97	13.12	— 4.85
3A	6,574	20.22	19.36	— 0.86
3B	9,068	22.36	26.64	+ 4.28
4	14,554	24.87	34.78	+ 9.91
5	33,793	57.54	91.51	+ 33.97
6	70,316	61.74	176.57	+ 114.83

The above table indicates that inadequate premium is received for risks below about $7,000 or that the break even point is at about a $20 annual premium. For policy amounts above $7,000 excess premium is received but this is needed under current rating methods to compensate for losses incurred for low valued risks.

"LOSS CONSTANT" DWELLING SCHEDULES

This investigation was made independent of any actuarial study by any rating bureau or advisory organization. However, the results are comparable to the so-called "Loss Constant" Dwelling Schedules which have been filed in a number of states. There are, however, a number of major differences in philosophy and approach which will be discussed.

The so-called "Loss Constant" Dwelling Schedules have now been adopted in the states of Mississippi, Tennessee, Missouri, Kentucky, Oklahoma and Washington and there are more filings pending. The author has reviewed one such filing wherein it was reported that the "Loss Constant" Schedule was based on a review of dwelling losses for a limited time by a number of individual companies. These studies showed that the average amount of loss was about the same regardless of the amount of the policy. In our opinion, this data was lacking in credibility and failed to recognize possible variation in loss frequency and an equally important factor in the low valued risk problem, that of expense. However, the similarity of results make it desirable to compare one of these schedules with the data developed during the course of this investigation.

Exhibit 9 shows the former dwelling fire rates for Tennessee and the new "loss constant" dwelling schedule rates. No changes were made in the Extended Coverage rates and the Loss Constant Schedule applies only to Fire insurance. Under this schedule the loss constant is charged for each item, that is, a separate loss constant for the building item and a separate charge

for the contents item. Thus, a policy covering both buildings and contents would incur a $14 loss constant instead of a $7 loss constant.[6]

Exhibit 10 shows a comparison of the premium required for various policy amounts, computed by means of the suggested rate formula developed by this study and the premium developed by the Tennessee Loss Constant Schedule for protection class 5. Protection class 5 was used because the original Tennessee rate of 28¢ compares closely to the average required rate developed by this study of 27.6¢. Our formula provides higher premiums for the small risk and somewhat lower premiums for the larger risk when compared to the "Loss Constant" Schedule.

VARIATION IN EXPENSE RATIO BY PREMIUM AMOUNT AND OCCUPANCY CLASS

This study indicates the desirability of considering the variation in both expenses and losses in the determination of proper rate levels by occupancy class. Historically, expense data has been maintained by "line" of insurance. This is a reasonable approach assuming that the various units within the "line" are reasonably homogeneous. In the case of Fire and Allied Lines, such an assumption is not truly valid.

As pointed out earlier in this paper, the Habitational classes comprise about 40% of the total premium written in the Fire and Allied Lines category on a countrywide basis. The remaining 60% is made up of mercantile, non-manufacturing and special hazard risks. Each of these classes has its own expense breakdown. Higher commissions are paid on dwelling business, for example, and this factor alone could account for a variation in expense of 10 to 15 percentage points. Thus, the use of an "average" expense formula for all Fire and Allied Lines distorts the true rating structure of any particular "class" within this category. Thus, the true expense of the Residential Class is buried in the average expense for all Fire and Allied Lines.

A second factor which distorts the expense picture is that of variation in average premium. The Residential Class develops lower average premiums per policy than the mercantile or non-manufacturing classes, for example. Since a large part of the expenses are related to a "work unit" or policy base rather than a premium base, this means that the Residential Class will incur a higher expense ratio because the average premiums are lower.

Using the data developed by this study, we can readily determine the effect that lower average premiums have on the actual expense ratio. Exhibit 11 shows the actual expense ratio for various policy premium amounts. With a $10 premium the actual expense ratio is 101.8%, but with a $100 premium the actual expense ratio is only 38.35%. If we consider that a 45% expense ratio is reasonable, it is apparent that an average premium of at least $50 must be developed by the company if their own Fire and Allied Lines expense ratios are going to be comparable to the average.

It is also obvious that a company specializing in low average premium business, such as dwellings, will develop higher than "average" expense ratios unless they reduce commissions or otherwise compensate for this unfavorable expense situation.

In connection with a rate hearing held in New York several years ago, cer-

[6] The Loss Constant Schedule adopted in Mississippi uses a single "loss constant" charge per policy rather than per item. All other schedules have been filed on a per item basis.

tain average premium figures were presented by the New York Fire Insurance Rating Organization as follows:

Occupancy	Average Premium	Total Policies
Dwelling	$ 35.60	5377
Other than Private Dwellings	140.00	2693
Total	$ 70.40	8070

Reference to Exhibit 11 shows that a company with an average "book" of business and having an average Fire and Allied Lines premium of $70 should incur an expense ratio of about 41%.

However, a company specializing in dwelling business and developing an average premium of only about $35 will incur an expense ratio of 51.5%.

It is thus evident that a company should not rely too heavily on their "average" Fire and Allied Lines expense ratio in determining the underwriting gain or loss for a "class" of business within the Fire and Allied Lines category. In reality many companies are producing an underwriting loss on low average premium business which can only be offset by a profitable block of high average premium business.

In our opinion, the above analysis indicates the necessity and desirability of considering both the expense and loss ratios by class in support of any particular rate level. The requirement to "better" a standard expense formula based on all Fire and Allied Lines experience will inevitably penalize the company who writes a high proportion of low average premium business and favor the company who writes a high proportion of specifically rated risks or high average premium business.

In this respect, the provisions in the Casualty and Surety Rate Regulatory Bill with regard to expense is more realistic and, in fact, should be equally applicable to Fire and Allied Lines.[7] The tendency of regulatory authorities to use a "standard" expense ratio as a convenient yardstick and their reluctance to consider variation in loss experience indicates that any changes in this area will be slow in coming.

CONCLUSIONS

1. A realistic rate formula for Fire and Allied Lines should include the following major components:
   a) Fixed Expenses
   b) Variable Expenses
   c) Losses
   d) Profit and Catastrophe

[7] Section 3(a), paragraph 3, of the Casualty and Surety Rate Regulatory Bill, as approved by the National Association of Insurance Commissioners June 12, 1946, provides as follows: "The systems of expense provisions included in the rates for use by any insurer or group of insurers may differ from those of other insurers or groups of insurers to reflect the requirements of the operating methods of any such insurer or group with respect to any kind of insurance, or with respect to any subdivision or combination thereof for which subdivision or combination separate expense provisions are applicable."

2. The results of this study indicate that the relationship of the premium required to pay losses and the policy size are in the form of the equation $y = ax^b$. Further studies would be desirable to determine if Fire and Extended Coverage losses varied in the same manner.

3. The variation in average size of premium will have a marked effect upon the expense ratio of a company. A company specializing in private dwelling business will inherently incur a higher expense ratio than a company with a better spread of business in the Fire and Allied Lines category.

4. Regulatory authorities should be encouraged to consider the possible variation in expense which results from the kind or class of business written rather than use a single average expense as a yardstick.

5. This study indicates that current rating practices in the Fire and Allied Lines field tend to develop inadequate rates for low premium risks such as dwellings, and produce excessive rates for high premium risks or occupancy classifications.

EXHIBIT 1

FIRE EXPERIENCE
NATIONAL BOARD OF FIRE UNDERWRITERS
COUNTRYWIDE 1956-1960

Habitational Risks*

Year	Written Premium	Paid Losses	Loss Ratio
1960	$453,514,173	$271,930,321	60.0%
1959	503,571,975	276,065,386	54.8
1958	510,835,640	270,160,046	52.9
1957	494,657,980	254,311,491	51.4
1956	501,193,296	255,060,802	50.9

All Other Risks

Year	Written Premium	Paid Losses	Loss Ratio
1960	$791,755,511	$362,767,247	45.8%
1959	760,961,542	355,977,083	46.8
1958	711,321,841	346,136,155	48.7
1957	718,710,625	363,922,191	50.6
1956	690,219,442	343,164,173	49.7

*The following classes comprise the Habitational Group: 002 Household Contents in Mercantile Buildings; 007 Boarding Houses; 009 Household Contents - Dwelling; 011 Seasonal Dwellings; 019 Dwelling Building & Contents; 021 Farm; 029 Dwelling Building Only; 030 Large Area Housing; 031 Apartment Buildings Without Mercantile; 032 Apartment Buildings With Mercantile; 033 Household Contents - Apartments.

EXHIBIT 2

TREND IN PREMIUMS WRITTEN BY LINE
(LAST 000 OMITTED)

Year	Total Premium	Fire	Extended Coverage	Homeowners
1960	$10,527,285	$1,387,420	$480,229	$617,230
1959	9,930,697	1,433,516	531,609	420,544
1958	9,076,828	1,362,713	525,648	280,550
1957	8,640,093	1,335,719	511,192	195,136
1956	7,991,071	1,332,478	502,222	149,165
1955	7,662,138	1,317,031	470,169	59,332
1954	7,143,593	1,307,738	407,171	- -
1953	7,000,347	1,306,224	370,468	- -
1952	6,410,590	1,288,997	343,532	- -
1951	5,137,529	1,300,695	313,097	- -

Data from "Best's Fire and Casualty Aggregates and Averages", Twenty-Second Annual Edition (1961), Alfred M. Best Company, Inc., New York

EXHIBIT 3

RESULTS OF 10 DAY SURVEY OF FIRE & ALLIED LINES BUSINESS
TOTAL OF 11,203 POLICIES

Average Premium

Occupancy	Amount Groups							
	1	2	3A	3B	4	5	6	Total
Dwelling Contents	18.01	23.46	35.22	54.56	92.27	-	-	24.58
Dwelling Building	22.97	28.11	33.55	49.46	58.15	117.55	169.67	49.23
Dwelling B. & C.	42.05	42.98	37.89	47.74	66.48	93.65	-	56.80
Apt. Buildings	15.75	25.31	26.00	128.00	80.00	107.00	245.50	63.23
Boarding Houses	19.00	11.00	-	-	-	220.33	-	169.00
Seasonal Dwellings	23.75	37.53	49.13	45.00	58.60	222.33	253.00	53.64
Total Habitational	19.07	24.57	35.14	49.41	61.53	120.39	156.45	38.94
Farms	21.00	42.08	53.14	61.40	123.76	-	-	91.19
Mercantile	28.16	50.03	76.53	99.24	137.09	295.48	431.56	87.09
Grand Total	19.53	25.45	37.56	51.69	67.47	177.53	342.56	41.65
1960 Experience	19.42	25.38	42.17	42.17	65.60	177.89	301.09	44.04

Average Risk Amount

Occupancy	Amount Groups							
	1	2	3A	3B	4	5	6	Total
Dwelling Contents	2,486	3,738	6,174	8,837	13,137	35,000	85,000	3,988
Dwelling Building	1,911	4,826	6,530	9,116	14,519	31,662	72,333	10,121
Dwelling B. & C.	2,068	4,169	7,071	8,980	14,048	30,765	66,667	10,640
Apt. Buildings	2,500	3,654	7,000	8,000	18,308	35,750	74,200	15,532
Boarding Houses	2,500	5,000	-	-	-	28,333	-	22,188
Seasonal Dwellings	2,000	4,183	6,763	8,667	12,600	29,533	77,000	8,503
Total Habitational	2,447	3,911	6,586	9,059	14,367	31,552	73,127	7,341
Farms	500	3,643	6,429	8,720	15,225	-	-	10,952
Mercantile	1,938	7,141	6,383	9,278	16,986	38,421	68,971	13,051
Grand Total	2,420	4,016	6,574	9,068	14,554	33,793	70,316	7,649

EXHIBIT 4

DETERMINATION OF LOSS COSTS BY AVERAGE POLICY AMOUNT ON WRITTEN BASIS

Amount Group	Average Size Risk	No. Risks	Total Liability	Losses Paid	Loss Cost
1	$ 2,420	228,327	$ 552,551,340	$ 856,444	15.50¢
2	4,016	756,995	3,040,091,920	4,543,679	14.95
3	7,997	612,920	4,901,521,240	6,570,097	13.40
4	14,554	411,214	5,984,808,556	5,238,354	8.75
5	33,793	16,871	570,121,703	751,497	13.18
6	70,316	3,976	279,576,416	193,461	6.92
Total		2,030,303	$15,328,671,175	$18,153,532	11.84¢

Note: Average size of risk determined by 10 day survey. Number of risks and losses paid are from 1957-1960 experience by amount group.

EXHIBIT 5A

CONVERSION OF "WRITTEN" LOSS COSTS TO "IN FORCE" LOSS COSTS

Amount Group	Policy Amount Range	Loss Cost "Written"	Loss Cost "In Force"
1	$ 0 - $ 2,500	15.50¢	9.50¢
2	$ 2,501 - $ 5,000	14.95	9.16
3	$ 5,001 - $ 10,000	13.40	8.21
4	$10,001 - $ 25,000	8.75	5.36
5	$25,001 - $ 50,000	13.18	8.08
6	$50,001 - $100,000	6.92	4.24
	Average	11.84¢	7.26¢

EXHIBIT 5B

ANNUAL PREMIUM REQUIRED TO PAY LOSSES FOR VARIOUS POLICY AMOUNTS ALL FIRE AND ALLIED LINES

Amount Group	"In Force" Loss Cost	Average Policy Size	Annual Premium Required to Pay Losses
1	9.50¢	$ 2,420	$ 2.30
2	9.16	4,016	3.68
3	8.21	7,997	6.57
4	5.36	14,554	7.80
5	8.08	33,793	27.30
6	4.24	70,316	29.81

EXHIBIT 5C

ANNUAL PREMIUM REQUIRED TO PAY LOSSES FOR VARIOUS POLICY AMOUNTS HABITATIONAL LINES

Amount Group	"In Force" Loss Cost	Average Policy Size	Annual Premium Required to Pay Losses
1	10.11¢	$ 2,447	$ 2.47
2	8.63	3,911	3.38
3	7.70	8,006	6.16
4	3.92	14,367	5.63
5	6.41	31,552	20.22
6	3.50	73,127	25.59

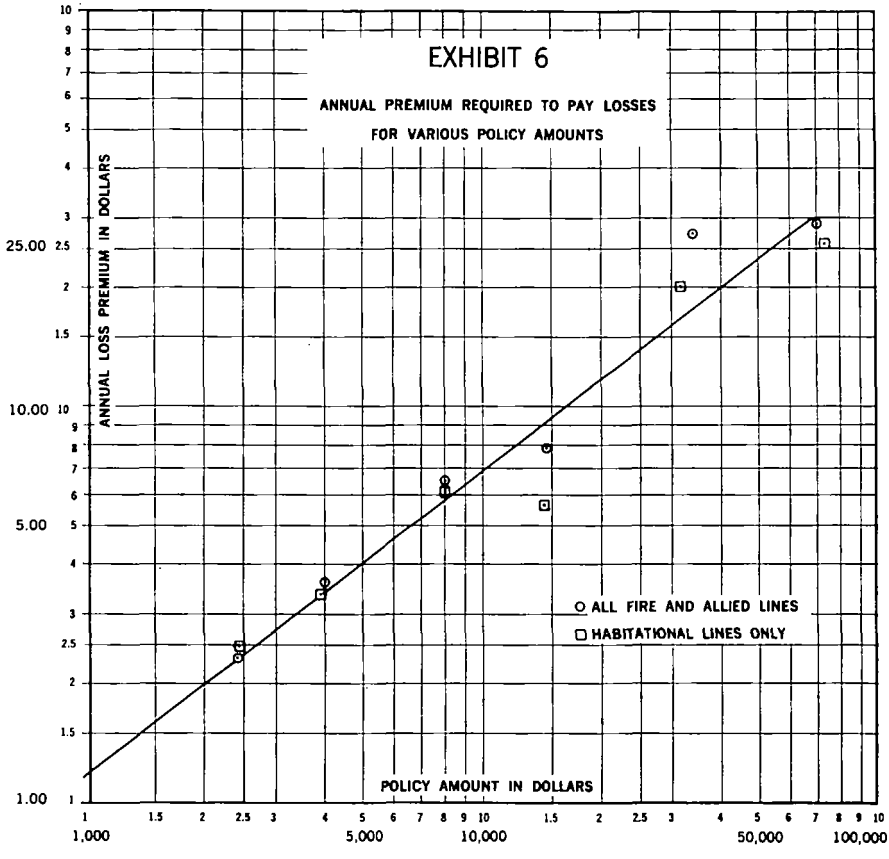
EXHIBIT 6
ANNUAL PREMIUM REQUIRED TO PAY LOSSES
FOR VARIOUS POLICY AMOUNTS
ANNUAL LOSS PREMIUM IN DOLLARS
25.00
10.00
5.00
1.00
ALL FIRE AND ALLIED LINES
HABITATIONAL LINES ONLY
POLICY AMOUNT IN DOLLARS
1,000
5,000
10,000
50,000
100,000

EXHIBIT 7

ANNUAL PREMIUM REQUIRED TO PAY LOSSES
FOR VARIOUS POLICY AMOUNTS

Policy Amount	Annual Premium Needed to Pay Losses	Loss Cost
$ 1,000	$ 1.17	11.70¢
2,000	1.99	9.95
3,000	2.72	9.07
4,000	3.38	8.45
5,000	4.01	8.02
6,000	4.58	7.63
7,000	5.15	7.36
8,000	5.74	7.18
9,000	6.25	6.94
10,000	6.80	6.80
11,000	7.32	6.65
12,000	7.82	6.52
13,000	8.36	6.43
14,000	8.80	6.28
15,000	9.30	6.20
16,000	9.73	6.08
17,000	10.15	5.97
18,000	10.57	5.87
19,000	11.02	5.80
20,000	11.48	5.74
25,000	13.53	5.41
30,000	15.50	5.17
35,000	17.60	5.03
40,000	19.50	4.88
45,000	21.30	4.73
50,000	23.20	4.64
60,000	26.60	4.45
70,000	29.95	4.28
80,000	33.40	4.18
90,000	36.70	4.08
100,000	39.50	3.95

EXHIBIT 8

REQUIRED PREMIUM FOR VARIOUS POLICY AMOUNTS

Policy Amount	Required Premium	Annual Rate Required
$ 1,000	$13.77	137.70¢
2,000	15.14	75.70
3,000	16.37	54.56
4,000	17.47	43.67
5,000	18.53	37.06
6,000	19.48	32.46
7,000	18.76	26.80
8,000	21.42	26.77
9,000	22.48	24.97
10,000	23.20	23.20
11,000	24.07	21.88
12,000	24.91	20.75
13,000	25.81	19.85
14,000	26.55	18.96
15,000	27.39	18.26
16,000	28.11	17.56
17,000	28.81	16.94
18,000	29.51	16.39
19,000	30.27	15.93
20,000	31.04	15.52
25,000	34.47	13.78
30,000	37.77	12.59
35,000	41.29	11.79
40,000	44.47	11.11
45,000	47.49	10.55
50,000	50.67	10.13
60,000	56.37	9.39
70,000	61.98	8.85
80,000	67.76	8.47
90,000	73.28	8.14
100,000	77.97	7.80

EXHIBIT 9

TENNESSEE DWELLING FIRE RATES

1. Old Rates:

Protection Class	Annual Rates	
	Building	Contents
2	20¢	20¢
3-4	22	24
5	28	28
6	32	32
7	36	36
8	38	38
9	52	52
10	56	56

2. New "Loss Constant" Schedule Rates:

Protection Class	Annual Rates		Loss Constant
	Building	Contents	
2	6¢	6¢	$7.00
3-4	10	10	7.00
5	14	14	7.00
6	18	18	7.00
7	22	22	7.00
8	26	26	7.00
9	30	30	9.50
10	34	34	9.50

EXHIBIT 10

COMPARISON OF PREMIUM REQUIRED BY FORMULA WITH TENNESSEE "LOSS CONSTANT" PREMIUMS

1. Premium Required by Formula:

Policy Amount	Required Premium @ Average Rate of 27.60¢	Required Premium Using Formula
$ 1,000	$ 2.76	$13.77
5,000	13.80	18.53
10,000	27.60	23.20
15,000	41.40	27.39
25,000	69.00	34.47
50,000	138.00	50.67

2. Tennessee "Loss Constant" Schedule - Protection Class 5:

Policy Amount	Old Rate	Old Premium	New Rate	Loss Constant	New Premium
$ 1,000	28¢	$ 2.80	14¢	$7.00	$ 8.40
5,000	"	14.00	"	"	14.00
10,000	"	28.00	"	"	21.00
15,000	"	42.00	"	"	28.00
25,000	"	70.00	"	"	42.00
50,000	"	140.00	"	"	77.00

EXHIBIT 11

VARIATION IN EXPENSE RATIO
BY PREMIUM SIZE

Premium	Fixed Expense	Variable Expense	Total Expense	Expense Ratio
$ 10	$7.05	$ 3.13	$ 10.18	101.8 %
15	"	4.70	11.75	78.33
20	"	6.26	13.31	66.56
25	"	7.83	14.88	59.52
30	"	9.39	16.44	54.80
40	"	12.52	19.57	48.93
50	"	15.65	22.70	45.40
60	"	18.78	25.83	43.05
70	"	21.91	28.96	41.37
80	"	25.04	32.09	40.11
90	"	28.17	35.17	39.08
100	"	31.30	38.35	38.35
125	"	39.13	46.18	36.94
150	"	47.00	54.05	36.03
175	"	54.78	61.83	35.33
200	"	62.60	69.65	34.83
300	"	93.90	100.95	33.65
400	"	125.20	132.25	33.06
500	"	156.50	163.55	32.71

NOTE: From our formula on page 11 we determine that the variable expense equals the sum of commissions (24.3%), taxes (3.3%) and "variable" other expense (3.7%) or a total of 31.3%.

APPENDIX A

DETERMINATION OF REQUIRED TERM PREMIUMS FOR VARIOUS AVERAGE POLICY AMOUNTS

In order to compare the required premium with the actual average premiums received for various average policy amounts, consideration has to be given to the average term factor involved. Appendix B shows the computation of the average term factor of 1.94 for all Fire and Allied Lines. The actual average premium received divided by 1.94 produces the average annual premium. This premium can then be compared with the average annual premium required computed in accordance with the established formula. The results are as follows:

(1) Average Policy Amount	(2) Annual Premium Required To Pay Losses	(3) Total Annual Premium Required	(4) Actual Premium Received	(5) Actual Annual Premium	(6) Difference Col. 5 Minus Col. 3
$ 2,420	2.30	15.66	$ 19.53	$ 10.07	- $ 5.59
4,016	3.68	17.97	25.45	13.12	- 4.85
6,574	5.02	20.22	37.56	19.36	- 0.86
9,068	6.30	22.36	51.69	26.64	+ 4.28
14,554	7.80	24.87	67.47	34.78	+ 9.91
33,793	27.30	57.54	177.53	91.51	+ 33.97
70,316	29.81	61.74	342.56	176.57	+ 114.83

Note (1): Total Annual Premium required computed using formula $X = \frac{\$7.05 + L}{.597}$

Thus, for average policy of $2420:
$X = \frac{\$7.05 + 2.30}{.597} = \frac{\$9.35}{.597} = \$15.66$

Note (2): Actual Annual Premium = Actual Premium Received divided by average term factor of 1.94.

Thus, for average policy of $2420:
Annual Premium $= \frac{\$19.53}{1.94} = \$10.07$

APPENDIX B

DETERMINATION OF AVERAGE TERM FACTOR FOR FIRE AND ALLIED LINES

1. Distribution of Premium In Force as of December 31, 1961:

Term	% of Total Premium in Force
1 year or less	2.54%
2 years	.28
3 years	54.23
4 years	.08
5 years	19.96
Installment	22.91
	100.00

Note: Distribution of premium is for the author's Company.

2. Normal Term Rate Factors:

1 year	1.0
2 year	1.85 x annual premium
3 year	2.70 x annual premium
4 year	3.55 x annual premium
5 year	4.40 x annual premium
Installment	.945 x annual premium

Note: The above represents the term factors in effect in most states at the present time. Some variation does exist but the effect on the results would be very small. Wisconsin, for example, still uses a 3 year term factor of 2.5. So do Louisiana and Texas. Some variation in the term factor for installment premium payment plans also exist, although a factor of .945 times the annual premium is most prevalent.

3. Determination of average term factor:

Term	% of Total Premium In Force	Normal Term Factor	Col. 2 Divided By Col. 3
1 year	2.54	1.0	2.54
2 years	.28	1.85	.15
3 years	54.23	2.70	20.08
4 years	.08	3.55	.02
5 years	19.96	4.40	4.54
Installment	22.91	.945	24.24
	100.00		51.57

$$\text{Average Term Factor} = \frac{100}{51.57} = 1.94$$