

DISCUSSIONS OF PAPERS READ AT THE
NOVEMBER 1952 MEETING

THE EXPENSE STUDY BY SIZE OF RISK

M. H. MCCONNELL

Volume XXXIX, Part II, Page 19

WRITTEN DISCUSSION BY A. N. MATTHEWS

Mr. McConnell has done the Casualty Insurance industry a distinct service by presenting the details of the size of risk study and in causing the results thereof to be presented in our *Proceedings*. Henceforth, any one having occasion to refer to the 1950 Size of Risk Study, be he an Insurance Commissioner, Company executive or a student preparing for our examinations, will refer to Mr. McConnell's paper in Volume XXXIX.

This is not the first study of Workmen's Compensation expenses by size of risk. At least one large company analyzed its expenses for this line in 1929 and 1930. This was followed in 1934 by a study that was made by the Pennsylvania Compensation Rating and Inspection Bureau to determine the percentage of cost that may be considered to follow the number of policies and the percentage that follows premium. A distinct gradation of administration expense by size of risk was indicated. This study is described in a paper entitled "Compensation Expenses per Policy" by Harmon T. Barber found in Volume XXI of the *Proceedings*.

In 1940, a number of companies, all members of the National Bureau, prepared a study of their Workmen's Compensation administration expenses for calendar year 1939 by size of risk. The results of this study were compiled by the Bureau. The indicated gradation of expenses was used to substantiate the premium discounts and expense provisions contained in the 1943 Rating Program. These earlier studies were limited to the Workmen's Compensation administration expenses of stock companies. The 1950 studies were the first to include the other acquisition and inspection items, or to embrace the Liability and Property damage lines. Also, the 1950 study included for the first time the expenses of mutual companies.

Mr. McConnell has given a detailed outline of the method used by his company to distribute home office administration expenses (page 27). It might be helpful to students of the problem to show a similar analysis of other acquisition expenses. The plan followed by the Travelers is as follows:

<u>Operation</u>	<u>Basis of Allocation</u>
Managers' Salaries and Expenses	Premium
Cashiers' Department Salaries and Expenses	
Administration Detail	Time Study
Clerical Detail	Time Study
Premium Reporting—Administration	Item Count
Premium Reporting—Clerical	Item Count
Branch Office Agents' Expense	Premium
Agents' Allowances	Premium
Policywriting Salaries and Rent	Time Study
Other Home Office Salaries and Rent	Overhead on Managers and Cashiers
Advertising	Premium
Printed Matter and Office Supplies	Overhead on Managers and Cashiers

The time study used as the basis of allocating administration and clerical detail under Cashiers' Department Salaries and Expenses was conducted in nine representative branch offices. In selecting these offices consideration was given to size, geographical location, distribution by line of insurance (Ohio and Massachusetts offices were not used), availability of personnel to supervise the study and stability of operations within the branch during the test period.

Administrative and clerical expenses in connection with premium reporting were distributed on a per item basis, using a study of the average number of premium items per policy by size of risk made in the Home Office Casualty Accounting Division.

Policywriting salaries and rents were distributed using as a basis the time study made in the Home Office Policywriting Division, since the expenses are for similar operations.

The final results produced for the Travelers Companies are similar to those shown for all stock companies combined as will be seen from the following comparison for the Workmen's Compensation line:

*Calendar Year 1949 — Workmen's Compensation
Other Acquisition Expenses Paid
By Size of Risk*

<u>Premium Size</u>	<u>Travelers</u>	<u>13 Stock Companies Combined</u>
Under \$50	18.5%	22.5%
50-99	12.4	12.4
100-499	4.4	5.2
500-999	3.4	3.6
1,000-4,999	2.5	2.8
5,000-9,999	3.4	2.9
10,000-24,999	2.3	2.6
25,000-99,999	2.1	2.8
100,000 & Over	1.7	2.1
Average	3.2	4.1

In the foregoing exhibit the percentages show a gradation similar to that for home office administration and justify the inclusion of other acquisition in the Compensation graduated expense procedure.

THE EXPENSE STUDY BY SIZE OF RISK

M. H. McCONNELL

WRITTEN DISCUSSION BY M. S. HUGHEY

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The expense study by size of risk undertaken by 13 stock and 5 mutual companies was one of the most significant and large-scale investigations into expenses undertaken in recent years. As such it deserves the most careful review and analysis by those concerned with the measurement of expense elements on a more scientific basis. A comprehensive outline of the historical background, methods used, and results such as Mr. McConnell has prepared is extremely valuable for study. The complete documentation with associated reports provides a convenient reference for considering this entire question and contributes importantly to the value of the presentation.

In his paper, Mr. McConnell has done an excellent job of presenting the highlights of the various phases of the job through quotations from committee reports, while maintaining continuity through the vast mass of detail which the study encompassed. The section outlining the methods used by the stock companies in general and Mr. McConnell's company in particular is especially worthwhile as a general guide to the procedure to be followed in a study of this kind. As Mr. McConnell pointed out in conclusion, this large-scale demonstration of the possibilities of using cost accounting methods and techniques may have highly important future significance.

In reviewing the outline and visualizing the steps required in such a study, several important points stand out.

- (1) Such a study requires a tremendous amount of time. A detailed analysis is no small undertaking and for a substantial size company, several man-years of work are required.
- (2) It is not enough to allocate the expenses of large segments of the operations on single bases, but the many individual operations within each segment must be separately evaluated. Anyone who has tried to review the handling procedure of a Compensation policy is aware of the large number of detailed operations which are involved.
- (3) Depending on how particular jobs are performed in different companies, there may be a wide range of expense distributions on those jobs. Take, for example, a premium collection operation. A company that uses a punch card collection file and system will have a different distribution of expense by size than a company that uses a strictly manual system.
- (4) Individual operations will vary widely in the distribution

of expense by size, even though the approach to making the distribution is quite similar. Note, for example, the contrast in the distribution of expense for "accounts collection" and "central files" as reported by Mr. McConnell, and yet both operations were allocated on an "item count" basis. Similarly, compare the wide contrast reported for "underwriting" and "history," where a "time study" was used. In the case of time study we expect a variation, but it is evident that no single base would provide an accurate allocation of the expenses of each of the many operations.

- (5) It is significant that those companies operating on the same general plan developed generally uniform results, in spite of different methods used in allocating specific items and different individual operation handling procedures. This suggests that the results achieved are reasonably credible as a measure of the expense elements on Compensation policies, as they existed at the time of the study.

Mr. McConnell has rightly called attention to the existence of the small risk problem. The much higher expense factor for Compensation risks under \$100 was made clear in the study. Mr. McConnell has reiterated the need for a new approach on risks of this type, a point which was brought out forcibly in the National Council's report of May 16, 1951 and reflected in the N.A.I.C. Sub-committee comments.

Of particular interest in this small risk problem are the expense results reported by both the stock and mutual companies on small Auto policies. Quite obviously, the companies have found ways of handling these policies which are far less expensive than the handling given small Compensation policies. This suggests that if enough thought and effort could be devoted to the problem, the expense on these small Compensation policies can also be reduced. It is probably reasonable to assume that after reviewing the results of this study, every insurance executive responsible for spending the individual company's money to the best advantage has taken a careful look at the operations being performed on small Compensation policies to see what economies could be accomplished.

Some improvement undoubtedly can be effected on an individual company basis. However, a problem is created by the fact that the Compensation handling has been developed out of the requirements of the larger risks. This resulted in the Compensation handling being largely dictated by state regulatory requirements, rating bureau requirements and company procedural practices on those larger risks. This situation has seriously deterred progress in simplifying the handling of smaller policies. Badly needed, obviously, is a complete new approach on these risks which will open the way to solving this problem.

The suggestions listed by Mr. McConnell all represent major change of the type that must be carefully considered and evaluated. Most

importantly, the Industry must be willing to depart from long established practices and be willing to try what may at first appear to be startling deviations. For the benefit of the insurance buying public, some of the refinements of rate making and regulatory control must give way to economical handling procedures.

NOTES ON THE EFFECT OF WAGE CHANGES ON
WORKMEN'S COMPENSATION PREMIUMS AND LOSSES

EDWARD S. ALLEN

Volume XXXIX, Page 59

WRITTEN DISCUSSION BY A. Z. SKELDING

I think it might be well to state at the outset, that after considerable experience, of many years, having to do with compensation rate-making, I am firmly convinced that the injection of a so-called wage trend factor in the compensation rate structure would be a tragic mistake.

With this preamble, it will be readily recognized that I am not going to take any really serious issue with the conclusions reached by Mr. Allen. If I were to take such issue, it would be along the lines that, to my way of thinking, Mr. Allen has, by his investigation, clearly demonstrated the inadequacies of a wage trend factor and, hence, I would liked to have seen conclusion number 11 to the effect that a wage trend factor in the compensation rate structure is but a snare and delusion — albeit an appealing one when the effect is for a reduction of rate level that would turn out to be anathema, in certain quarters, I am sure, when, if ever, the effect on rate levels should be reversed.

Mr. Allen has noted that “for many years there has been extended discussion concerning the reflection of the effect of wage changes in the determination of workmen’s compensation rate levels.” It should be noted also that there has been far more than just academic discussion of this item and quite some years ago, the compensation rate structure actually included definite and specific provision for such factor.

In this connection, I would like to quote from a report by the late Clarence W. Hobbs presented at the September 1925 session of the National Association of Insurance Commissioners. After stating that the workmen’s compensation loss experience had reached alarming proportions Mr. Hobbs said, “The theory was advanced that changes in loss cost not attributable to changes in law benefits were due to changes in wage level, and in preparing for a new revision the Council tentatively adopted the program of combining experience by the use

of factors expressing difference in law benefits and differences in wage levels." The proof of the pudding is in the eating. As to the results of that eating, Mr. Hobbs stated, "The theory on which the pure premiums were calculated developed, however, *in practice* notable defects. To begin with the conversion of experience in accordance with wage levels was a constant source of trouble. The average wage proved difficult of computation, especially for the latest year, and it became perfectly obvious that the average wage level was at times very radically different from the average wage level in single classifications. Moreover, it became apparent that law changes and wage level changes did not account for *all* of the variations in loss cost." Mr. Hobbs went on to comment that this procedure produced rate levels that were so low that it eventually became necessary to modify those rate levels through the use of estimates. This, in itself, resulted in chaos and gave rise to constant differences of opinion, not only between the National Council and supervisory authorities, but also among the various Regional Committees of the Council.

Mr. Hobbs then notes that this matter was brought to a head in connection with rate revisions in Massachusetts, New York and Virginia at which time it was recommended that the troublesome wage factor be eliminated.

Now, I think it must be perfectly obvious as to why a wage trend factor failed in the past and will fail in the future. It is so easy to fall for the apparently logical reasoning: If wages are increasing, premiums will increase, losses will increase, but, due to limits, losses will not increase as fast as premiums. Hence, with all other factors remaining equal, rates should be reduced.

The trouble is, all other factors do not remain equal, and hence it is the height of folly to blithely proceed on a path of ignoring those other factors, some of which may work in the same direction as wage changes and some of which may work in the opposite direction.

It is extremely difficult to understand the appeal of wage trend factors in the face of the obvious fact that wages is only one of the elements, beyond the normal experience period, which will affect compensation costs and, under certain extreme conditions, may be far outweighed by other elements.

You will recall the statements of Mr. Hobbs that some years back wage factors were advanced as a solution to the then adverse loss ratios but, in actual practice, it became apparent that the wage trend factor was defective in that it did not measure all of the variations in loss cost and, hence, for this reason as well as others the troublesome wage factor was abandoned.

Now, to my mind, a tremendously important fact is that the wage factor was found wanting when loss ratios were high. When loss ratios are running favorably and the introduction of a wage factor would tend to produce lower rate levels than would result in the absence of such factor and if loss ratios continue to run favorably in spite of such factor, nobody is too much concerned and probably

everybody, except perhaps, a few self-serving propagandists, is happy. I am far more concerned about corrective results when experience is running adversely. Supervisory authorities whose primary responsibility above all other considerations, in my opinion, is to insure the adequacy of rates should be of the same opinion.

It is at the very time when loss ratios are running adversely, perhaps due to unfavorable economic conditions, that these factors, which are not fully reflected by mere statistical wage trend data, become of supreme importance. That is what caused the previous abandonment of the wage factor by the National Council.

I do not care how well it can be demonstrated on paper that, in times of increasing wages, a wage factor is justified. A factor which has the very obvious fault of ignoring, in times of adverse loss ratios, all of the elements which affect compensation costs, is subversive, as far as I am concerned. I have no desire to get started down a one way street and, for more reasons than I have explicitly set forth, I fear a wage factor would be a one way street in the wrong direction.

Even in times of good loss ratios and increasing wages, the wage trend factor is defective. I have selected, at random, data for four states for which we have recently tabulated the experience for rate revision purposes. Covering about a five year spread, the increases, excluding increases due to law amendments, are as follows:

	<u>State I</u>	<u>State II</u>	<u>State III</u>	<u>State IV</u>
Average Indemnity Cost	20%	30%	40%	45%
Average Medical Cost	25	50	40	50
Wages	15	25	30	25

To my mind, these figures clearly demonstrate that for these states, and I am sure the situation is similar for most other states, that the upward trend in costs has appreciably exceeded the upward trend of wage changes. Hence, the inequity of any factor which ignores these other elements must be readily apparent.

To revert, for a moment, to the abandonment of the wage trend factor by the National Council quite a few years ago, it might be argued that this is rather ancient history and we should take another whirl at it. Perhaps conditions have changed. Therefore, I refer to the state of Texas.

In 1943, the Texas Board injected a wage trend factor in the Texas rate structure. This action of the Board was viewed by the carriers with what may be termed a jaundiced eye accompanied by a feeling of weakness in the pit of the stomach. You see, it was feared that this action was eventually going to hit hard in the pocketbook or wherever it is insurance companies keep their spare funds, if any. It is only fair to state that this feeling was not shared by one of the largest writers of compensation insurance in that state. In fact, that carrier had long been an ardent advocate of a wage trend factor and, for a number of years had carried on, singlehanded, a crusade for the adoption of

such factor, using the same faulty reasoning, in my opinion, that is now being used in support of that program. For the next few years Texas loss ratios continued mostly in the black. About 3½ years ago, the picture changed and there were indications that there were a few ripples on the hitherto calm surface — due, of course, to the fact that recognizing only wage trends and ignoring other cost elements, was beginning to catch up with the procession. The situation further deteriorated with the passage of time and then came the deluge.

To make a long story less long, the Board in November of 1952 which, by the way represented two rate level increases in less than a year (and law amendments were not involved) announced abandonment of the wage factor. Thus, History repeated itself.

In promulgating the December 1952 Texas revision the Board stated, in part,

“Continued studies of statistical data and attendant information which has become available since indicate irrefutably that the favorable influence of the continued increase in the average daily or weekly wages paid to employees covered by the Workmen’s Compensation Act is being more than offset by the increase in average indemnity and medical claims. Thus, if the Board continued to take account of the trend in wages alone during the period subsequent to the end of the two policy years and ignored other known factors affecting rate needs it would fail to comply with the statutory requirement that it make ‘fair, reasonable and adequate’ rates.

The Rate Level Adjustment formula of the National Council on Compensation Insurance takes account not only of the effect of payroll ‘sweetening’ but indemnity and medical costs as well, and the rates set out in Exhibit A have been determined by using this factor in lieu of a formula measuring the effect of wages alone.”

This action of the Board was supported by the carrier which had formerly been convinced of the desirability of a wage trend factor and, of course, was welcomed by the other carriers who had always viewed such factor with, to put it mildly, considerable skepticism.

Ed Allen’s “Notes” have, in my opinion, clearly and objectively pointed up the many serious problems involved in the introduction of a wage factor in the compensation rate structure. I think Ed is to be congratulated in bringing these problems forcefully to our attention.

NOTES ON THE EFFECT OF WAGE CHANGES ON
WORKMEN'S COMPENSATION PREMIUMS AND LOSSES

EDWARD S. ALLEN

Volume XXXIX, Page 59

WRITTEN DISCUSSION BY FRANK HARWAYNE

Mr. Allen's paper is one that has been long overdue. The subject of wage factors has been one of controversy for a great many years. It is well that attempts to define the problem are being made within the Society.

One point missed by the paper (but fortunately included in the formula used) is that when average number of hours of exposure to hazard increases, indemnity losses and medical losses will increase. Therefore (using Mr. Allen's reasoning) rate levels as otherwise calculated should be increased in order to avoid inadequate premiums. It would also follow that a reduction in average number of hours of exposure to hazard would require a decrease in rate levels as otherwise determined.

There is no disagreement that wage factors should be based on individual state data wherever possible.

For purposes of clarifying some possible misunderstanding concerning the validity of the samples used by the New York Department of Labor in determining averages in various industries. Mr. Allen's table of percentages of all employees included in the samples for each industry group is shown below, *together with the approximate number of employees covered by the sample* (obtained by applying the percentages to the total employments by industry) :

	<i>Percent</i>	<i>Approximate Number of Employees in Sample</i>
Manufacturing	47%	910,000
Extracting	43%	5,000
Contracting	25%	60,000
Utilities	30%	150,000
Trade	23%	290,000
Finance and Insurance	14%	60,000

Interested members and students might wish to determine to what degree averages based on the sample data might be expected to vary from the true averages of the total population.

It has been stated that "the percentage of the sample varies rather widely by individual categories within industry group. . . . The data are somewhat heavily weighted with large employers. . . ." In answer to this it should be noted that:

The influence of large employers' data is present in both the base

period and the period being compared so that the index of *change* is relatively accurate.

In addition, studies of Expenses by Size of Risk indicate that large risks comprise about 10% of all risks and produce over 75% of the premium for all risks. For some industries where a large variation in wage rates prevails the Department of Labor uses stratified samples.

The variation in average weekly earnings and hours and wage rates by individual categories within industry groups is reflected in the averages for the industry group. The influence of wages on workmen's compensation insurance premium and loss requirements is an overall adjustment item in the same sense that the adjustment of calendar year premiums to rate level is an overall adjustment item. It is proper for adjusting the business as a whole to special conditions.

Assuming the wage factor computations to be correct and valid by geographic area the fact that the New York City results differ from that of Elmira, Buffalo or some other area is of no consequence because the rates apply statewide and make no differentiation between territories. To attempt to do so for wage factor calculation alone is spurious.

There are a number of arguments for not reflecting the limitations on payrolls due to exclusion of certain payroll amounts. Elimination of that portion of payroll which is assumed to be overtime ignores completely the guaranteed wage contract or Belo-type contract which has become so popular in recent years. For insurance payroll purposes the guaranteed wages of these contracts are included even if such guaranteed wages contemplate earnings for hours in excess of forty hours. The estimate of 37 hours as the average straight time hours worked has less foundation than the estimate determined by the least squares method which Mr. Allen has acknowledged to be more proper.

The reduction in November 1949 average weekly wages from October 1949 is largely accounted for by the reduction in average number of hours worked and may be tied up with such events as the steel strike. The fact that adjusted wage results may not agree with preconceived notions is not sufficient reason for discarding such results. It is assumed that the payroll limitation rule applies to the first \$100 of weekly payroll and that this is completely synonymous with the rule which actually refers to the first \$5,200 of annual payroll. Finally it is assumed that the wage distribution tables used in the National Council law amendment calculations are accurate and sensitive enough to measure that small segment cut off by the payroll limitation rule.

It has been stated that an overall factor is not proper because there exists considerable variation in wage changes by industry and territory. Carrying this thought over to the field of loss experience who would argue that setting a rate level based on overall experience is

improper because considerable variation in loss experience changes exist by classification and territory?

A perusal of Mr. Allen's Exhibit E should be sufficient to indicate that between policy year 1948 and composite calendar year July 1, 1949-June 30, 1950 the reduction in average weekly hours (decrease in exposure to hazard) outweighed the reduction in adjusted average weekly wages. It was the fact that there was less hourly exposure which resulted in what appears to the uninitiated to be an anomalous situation.

The purpose of applying a wage factor is to adjust past experience to reflect current conditions (this is avowedly the purpose in applying factors to adjust to rate level also). Having done this, a proper judgment of levels for the coming experience period may be made. The use of calendar year experience by Mr. Allen may be criticized in that the calendar year experience is affected by changes of prior policy years (reserve policy, etc). In addition it should be observed that the effect of a wage factor is not cumulative but is reflected in the experience at a subsequent date.

The statement that claim frequency and severity offset the wage change effect might be pursued further in a quantitative way. The table of experience factors, wage factors and other factors might be more impressive if it were not for the fact stated above that calendar year experience suffers from the ills of prior policy years and therefore calendar year experience is nothing but a quicksand base from which to measure "other factors." Finally, it can be observed, in retrospect, that had the ratemaking organization relied on average underlying pure premiums in effect during the experience period rather than on the theoretical underlying pure premiums in effect at the time of each rate revision, rate levels would have produced better underwriting results than actually occurred for the postwar period. Who would argue that the former method is better because it offsets "imponderables" acting in a direction opposite to the adjustment indicated by past rate changes? Such a procedure merely leaves one with a blind faith that there will always be "imponderables" to offset procedures which only the naive could claim to conform to the thought expressed by Alexander Pope that whatever is, is right.

The conclusion expressed by Mr. Allen that published wage data have "possible sample bias" and include self-rated and self-insured data ignores completely that our interest in the data is from the standpoint of change from one period to the next. There is no reason to believe that the change in wages and hours differs materially by size of establishment or that minor changes in reporting necessarily make comparisons of data between periods invalid. If, as seems to be the case, these data are useful for measuring change, it becomes unnecessary for insurance carriers to obtain wage data from insurance statistics. If the carriers seriously believe material differences do exist, the expense and effort of compiling wage data may be worthwhile.

Concerning adjustments for overtime and payroll limitations, these seem to be undue refinements to the writer. What has unjustly been called "the actuaries' disregard of realities" is quite the opposite. If employees' exposure to hazard has been increased because more hours are worked and higher rates of pay are earned then the increased exposure requires increases in rate level. Likewise reductions in rate level can occur during a period of falling wage levels. The effects of changes in wages and hours on rate levels must be assessed in light of the facts and how these facts affect insurance transactions.

A fuller discussion of monthly and seasonal variation in industry might be desired. A period of less than twelve months might be used in calculating a wage factor if there is sufficient reason to believe that the shorter period is indicative of wage levels to be expected during the period for which rates are made.

The ratemaking procedure without the inclusion of a wage factor assigns the same weight to wage changes as to loss changes. This is essentially incorrect because wage changes are reflected in full in the payrolls for the period for which rates are made whereas loss changes may or may not be so reflected. Concerning a medical projection factor, in New York State medical losses are adjusted through law amendment factors to reflect the most recent agreement affecting the cost of medical care. What is this but a projection of actual medical costs to reflect costs which are expected to prevail during the period when the new rates are in effect?

As used in New York, the wage factor acts as a "governor" or "balance wheel" on the rate level.

In conclusion a wage factor represents a technical adjustment to reflect recent conditions and is therefore on a par with the adjustment of experience to reflect current rate levels and current law levels. The adjustment is necessary so that the ratemaking body may be able to evaluate properly, the past experience results if recent and current conditions had prevailed during the experience period. With this as a springboard it is possible to dare predict the levels required for the uncertain future.

REPLY TO THE DISCUSSION OF THE EFFECT OF WAGE CHANGES
ON WORKMEN'S COMPENSATION PREMIUMS AND LOSSES

BY EDWARD S. ALLEN

Mr. Harwayne's discussion is particularly welcome because, with regard to the use of wage factors, we hold very strong convictions which are diametrically opposed.

In his discussion, he has introduced the idea that an increase in the average number of hours worked requires an increase in rate level in addition to the automatic increase in premiums resulting from

higher aggregate payrolls due to the longer hours. This point was not mentioned in the paper nor was it included in the wage factor formula. The inclusion in the formula of the change in average weekly hours is for the purpose of eliminating, from the change in average weekly wages, that portion which is caused solely by the change in hours. If it is assumed that longer hours produce more fatigue and, therefore, increase the accident potential, we have a problem different from the measurement of a wage change effect.

There are, of course, a large number of employees included in the samples used for industry group wage data. The reliability of the samples, however, depends as much on the selection of the employees included as on the number of employees included. It is not asserted that the samples are not reliable. It is merely pointed out how easy it would be for bias to enter the sample. If such bias should enter the sample through a change in the units or areas reporting, the measurement of a wage change as well as the absolute value of wages could be appreciably affected. In New York, the data to which a wage factor would be applied are statistics of insured employers exclusive of those large enough to be self-rated. A wage factor is influenced largely by large insured and self-insured risks which are excluded from rate-making data. Even though we are measuring changes rather than absolute values, the timing of changes within the two groups may be quite different.

As to the variation by industry and territory of wage change indications, such variation is not important in itself if we are reasonably certain that we have a proper estimate of statewide changes. What was not originally made sufficiently clear is that such variation is a warning of the difficulties involved in obtaining a representative sample. How different our rates might be if based on a sampling of the loss experience in each classification is an interesting speculation.

Mr. Harwayne's points with respect to the bonus overtime adjustment illustrate well the approximate nature of the adjustments which it is necessary to apply to the published data. I cannot agree, however, that adjustments for overtime and payroll limitation are undue refinements. As is illustrated in exhibits compiled for this paper, these adjustments can affect the change in average weekly wages by as much as 3% or more. If wages continue to increase, the effect of the payroll limitation rule becomes increasingly important. In Exhibit A it will be noted that the effect is 0.5%.

One minor point concerns the reduction in average weekly wages from October to November of 1949. The reduction, even after adjustment, is more than can be accounted for by the reduction in average hours worked. The preconceived notion referred to is not the basis for discarding anything, but is a consideration in evaluating alternative methods of approximation.

In the same paragraph, Mr. Harwayne makes certain assumptions with respect to the payroll limitation rule. The payroll limitation rule does not apply to the first \$100 of weekly payroll and there is

no rule which I can find that actually refers to the first \$5,200 of annual payroll. The payroll limitation rule excludes remuneration earned in excess of an average of \$100 per week for the total time employed during the policy period.

Mr. Harwayne has pointed out that, in Exhibit E, the indicated reduction between policy year 1948 and composite calendar year July 1, 1949-June 30, 1950 is due to a greater reduction in average weekly hours than in average weekly wages. From a public relations standpoint, there would be no difficulty in explaining this result to an insured since the final result is a reduction in rate level. A complication arises, however, in the indicated increase for the period from composite policy year July 1, 1948-June 30, 1949 to calendar year 1950. In this instance, there is not a greater increase in average weekly hours than in average weekly wages. The increase must be explained as a combination of the effects of adjustments for bonus overtime, payroll limitation, effect on indemnity losses and change in average weekly hours.

As to the use of calendar year experience in comparing the effects of wage and experience changes, it does not seem likely that "reserve policy, etc." could account for indicated increases for eight successive years.

It has been noted by Mr. Harwayne that if we had used average underlying pure premiums in effect during the experience period rather than the theoretical underlying pure premiums in effect at the time of each rate revision, rate levels would have produced better underwriting results than actually occurred for the postwar period. As I understand this observation the result could be accomplished by delaying the application of each revision for approximately two and one-half years. I do not know what calculations were made to indicate this result, but it would be surprising if the "imponderables" which were responsible for the result were consistent from year to year in producing such result. The "imponderables" which largely offset wage factor reductions and which indicated higher than one wage factor increase were fairly consistent for the latest eight years of the nine-year period. No one can say at this time whether such "imponderables" will reverse their indications during a period of decreasing average weekly wages or even whether they will continue their past consistency.

An evaluation of the effect of monthly and seasonal variation would require a fairly substantial amount of study. If a wage factor is to be based on a period of time less than a year, a full study should, of course, be made.

I disagree very strongly with the statement that it is essentially incorrect to assign the same weight to wage changes as to loss changes, and I do not agree that a wage factor adjustment is on a par with the adjustment of experience to reflect current rate levels and current law levels. There is no reason to assume that wage changes are reflected in full in the payrolls for the period for which rates are made

and that loss changes may or may not be so reflected. If wages and losses have been increasing, they may both continue to increase, they may both decrease, or they may go in opposite directions. Changes in rate levels and law levels become effective at a specific point in time for all insured risks. They are, therefore, susceptible to measurement prior to the date on which they become effective. Wage and loss changes can be measured only from statistics which reflect the results of such changes. Insurance statistics reflect the composite of these changes to approximately the same point in time as wage statistics reflect the results of wage changes only.

Concerning Mr. Skelding's discussion, there is very little to be added or commented upon, since I do not take exception to anything which he has stated. It is not surprising, however, to find many proponents of the use of wage factors because of the strong logical arguments in their favor. In spite of previous experience with wage factors and recent study as set forth in this paper, I believe it is up to the industry to continue a review of wage change effects as more experience becomes available until little doubt, concerning whether or not such factors should be used, remains in the minds of everyone familiar with the data.

A STATISTICAL STUDY OF LARGE FIRE LOSSES WITH APPLICATION
TO A PROBLEM IN CATASTROPHE INSURANCE

BY L. H. LONGLEY-COOK

Volume XXXIX, Page 77

WRITTEN DISCUSSION BY FRED DOREMUS

This study is a worth-while contribution to the business of fire insurance underwriting and should be equally valuable to that group of studious men, employed by large organizations, responsible for buying insurance for their employers. We can not see that this study would have too great an appeal to brokers or agents.

The point is well made in this study that it is not possible to develop a rate of premium per \$100 of coverage. Instead, a suitable premium in dollars must be selected on a judgment basis with relation to the limited exposure above a high fixed amount of first loss sustained by the insured. The determination of the amount of premium could well become highly competitive if any sizeable market existed for the writing of catastrophe insurance.

While not set forth in the study, the view could be taken that two or more catastrophe insurance covers should be offered to the same insured having high values concentrated in a limited geographical area. The second and subsequent ones being for higher limits than the first, and each additional one treating the total of all preceding

ones as the amount of "first loss sustained." Each additional catastrophe cover would then have a premium selected on a judgment basis giving due consideration to the lessened possibility of loss as reflected in the distribution of large losses as contained in Table No. 1 which relates number of losses to size of loss.

While there is a real academic value to this study of catastrophe insurance, it has long been my view that a realistic approach to the sale of our regular product to self-insurers would have more lasting value to our insurance economic structure than the development of this type of partial protection which encourages the expansion of self-insurance.

NEW YORK COMPENSATION RESERVE SCHEDULE R

BY MATTHEW RODERMUND

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WRITTEN DISCUSSION BY ROGER A. JOHNSON

Mr. Rodermund's well-written paper is a valuable contribution to the proceedings of the Society for it casts light on a subject not covered, to my knowledge, in any previous paper. Since only New York domestic mutual companies are required to utilize Schedule R, the subject is one which has not generally received much attention elsewhere. Mr. Rodermund has made a concise, factual presentation of his subject, with which it is difficult to find fault.

Because of the work involved first in the actual preparation of Schedule R itself, and secondly, in the eighteen schedules which must be filed with the New York Insurance Department by December 15th each year, which enable the Department to calculate the necessary factors for the coming December 31 statement, there is some opposition to Schedule R. The fact remains, however, that over a period of years, the reserves produced by Schedule R methods have proven to be remarkably accurate. Schedule R, by reason of the fact that adverse development of cases in the recent past is recognized in the calculation of its values, seems to reflect periods of rising loss ratios or increasing costs much sooner than do regular reserve methods.

The following elements in Schedule R are chiefly responsible for the final result being different from Schedule P or other reserve methods:

- (1) All claims, other than death, incurred during the last six months are set up at a constant value, such constant varying from year to year and from company to company in accordance with each company's own experience.

(2) Temporary cases, not closed by awards, incurred more than six months ago, are set up on case estimates or \$2,000, whichever is the greater.

(3) Temporary cases, not closed by awards, incurred more than three years ago, and having three years of disability, are set up on a permanent total basis.

(4) In addition to case estimates on all open cases older than six months, a percentage contingency loading is included, which is based on the individual carrier's past experience with such cases.

(5) A reserve for reopened cases.

It is suggested that carriers not now using Schedule R would do well to investigate its possibilities, not with the idea of adopting it lock, stock and barrel, but with the idea of using it or a similar method as a check on reserves determined by other means.