

THE COMPENSATION RATEMAKING PROBLEM IN
THE LIGHT OF THE 1923-24 REVISION

BY

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The 1923-24 general revision of compensation insurance rates is only now being completed. In its inception, this revision was based upon a theory of ratemaking which Mr. A. H. Mowbray developed in a paper presented to this Society on May 25, 1923.

Mr. Mowbray's basic thesis might, I believe, be concisely approximated as follows:

- 1—In making compensation rates, the principal factors are
 - a—the accident rate
 - b—the rate of wages, and
 - c—the benefit scale.

- 2—For practical purposes we may assume that the accident rate per "full time worker" is constant.

- 3—The wage rate is variable and accordingly it is necessary to ascertain the wage rate which will prevail in the immediate future and translate our experience to that wage level.

- 4—Our experience must, of course, be adjusted to the latest benefit scale.

Mr. Mowbray developed the application of this theory in considerable detail in his paper along the following lines:

1. Conversion factors were to be applied to each of six "kinds of injury" and to "payroll," to translate the experience of a stated policy year to "state latest," *i. e.*, to the "level" of present law and "future" wages.

- (a). The payroll conversion factor was to be identical with the estimated change in average wage rate.
- (b). The loss conversion factors (with the exception of medical) were to reflect both wage change and benefit change, as applied to the "type of injury" and dependency distributions of the American Accident Table.

2. The medical differential was to reflect the actual change in cost per compensable case, as indicated by a comparison of the data for the latest Schedule "Z" year with that for earlier years. In this comparison, allowance was to be made for any change in

the number of compensable cases owing to a change in waiting period.

3. The Schedule "Z" data were to be converted first to the state latest level and then to a "basic" level, *i. e.*, that of a selected state (New York), by the use of factors computed by methods in every way analogous to those just described.

4. It was intended to select pure premiums upon the basic level, with due regard to "state exceptions," separately for each of the six kinds of injury (death, permanent total, major permanent partial, minor permanent partial, temporary and medical).

5. The selected pure premiums (on the basic level) were to be "reverted"* to the "latest" level of each state by using the reciprocals of the factors used in combining the data.

The 1923-24 revision itself afforded no comprehensive test of its original theory upon which, consequently, we shall not attempt to pass judgment. Our object will be to describe and account for certain material departures from this theory which took place during the revision as well as some details of its practical application. As the question of rate level is obviously paramount we shall first discuss

THE PROJECTION FACTOR

The use of a "projection factor" would not appear to be consistent with the hypothesis advanced by Mr. Mowbray although in the concluding paragraphs of his paper, he admitted the possibility that its introduction might be justified under certain conditions. The Rates Committee of the Council, however, in reviewing a working outline of the method July 13, 1923, adopted a resolution which approved the proposed method, as far as the combination of experience was concerned, but made the following reservation regarding rate level; "in order to translate such experience to the level of present day experience, the Actuarial Committee is instructed to prepare the necessary factors to accomplish this result and report to the Rates Committee." This resolution reflected a doubt in the minds of some members of the Rates Committee that the proposed method would

*Mr. Mowbray did not use this term.

produce adequate rates in view of the unfavorable experience under policies issued in 1921 and 1922.

In the first instance, the Actuarial Committee and the Council Staff recommended keying the new rates to the cost level of policy year 1922, through a comparison of "manual loss ratios," to be made separately for each state.

Aggregate data as to premiums written and losses paid and incurred for policy years 1918-1922 were being tabulated by the Council from individual carrier reports (See Exhibit B). Premiums written and losses paid down to June 30, 1923 *for policy year 1922 were to be "projected" to "ultimate" earned premiums and losses incurred by factors derived from study of the corresponding developments for previous policy years. Ultimate (collected) premiums were to be modified for changes in rate level, and to eliminate the effect of schedule and experience rating, in order to put such premiums upon the basis of the then manual rates. Ultimate (actual) losses were to be modified to bring them to the basis of the latest workmen's compensation law. Dividing the "ultimate" losses on the basis of the latest law by the "ultimate" premiums on the then manual basis would give the 1922 "manual loss ratio" which would be the numerator of the projection factor.

The denominator of the projection factor, the manual loss ratio represented by the individual classification experience employed in making rates, was to be obtained by (1) converting Schedule Z aggregate data for 1918-1920 (the policy years for which data were to be reviewed in the selection of pure premiums) to "state latest" basis (using the conversion factors above described), and taking off the aggregate *state latest pure premium* for the three years combined; (2) applying current manual rates to the classification payrolls for the same years, and taking off the *average manual rate*, and (3) dividing the state latest pure premium, by the average manual rate.

The Actuarial Committee recognized that this procedure might have to be modified for states where, because of the lack of rate regulation, there would be uncertainty that the 1922 loss ratio would be upon a correct manual basis.

*The projected 1922 loss ratio as actually employed in the rate level calculations was based on premiums written and losses paid brought down to the latest practicable date,—December 31, 1923, in a majority of the states.

The projection factor was intended to apply to the indications of each state's own experience. The pure premiums actually employed for each state would largely be based upon national experience, reverted to the state latest level by theoretical factors. It was consequently provided that before applying the projection factor, those pure premiums not based on local experience were to be "trued up" by a comparison of actual state losses with the expected losses obtained by applying the selected pure premiums to the state classification payrolls.

The recommendations* of the Actuarial Committee and Council Staff were presented to the Rates Committee and approved by it on October 18, 1923. However, the presentation of concrete data for certain states precipitated a marked divergence of opinion in both committees as to whether this "a priori" decision should be adhered to.

It became apparent that keying to 1922 would result in a material modification of the "state latest" level, the "developed" loss ratio for 1922 being generally higher than that for 1921, which in turn was almost universally higher than the average for 1918-1920. Some committee members held that 1922 was the correct basis because that year represented a new high level of pure premium cost due to increases in accident rate and in the liberality of claim administration. Others held that no projection factor was needed for the following reasons:

1—The upward cost trend of 1921 and 1922 policy years (to the extent to which it actually existed) was characteristic of an industrial depression which had already passed.

2—Improvement in general economic conditions would bring about an amelioration of loss ratios (largely through increased wage rates) analogous to the bettering of the business during the war period.

3—The indicated 1922 loss ratio was erroneously high, as heavy additional would bring the ultimate premiums to a point higher than that indicated by the premium development factors used.

In these discussions, whose ramifications defy the chronicler, there evolved a type of "rate level calculation" which was to be generally employed throughout the revision (see Exhibit C). On this sheet are shown manual loss ratios for policy years 1918-

*See Exhibit A for a general outline of these recommendations.

1920 combined (column 3), 1921 (column 12) and 1922 (column 21). All these manual loss ratios are upon the "state latest" basis, *i. e.*, they reflect current manual rates, current law and "future" wages. Similar loss ratios for 1921-1922 and 1918-1922 are obtained as arithmetic averages. "Increasing cost" factors are taken off on the basis of the latest one, two, or five years observed, by comparison of their respective loss ratios with that of the years (1918-20 or 1918-21) whose experience is employed in making classification rates.

Up to this point, the calculation indicates what modification of the results of the original procedure should be made, assuming that the selected "future" average wage is correct. This average wage had been generally based upon payroll audit data covering approximately calendar year 1922. It was known that for many states and industries a material wage increase had occurred from the summer of 1922 to the spring of 1923, recognition of which would tend to offset the increasing cost factor and consequently a "wage change factor" was introduced.

In the first few states considered the wage change factor was based on data compiled by the National Industrial Conference Board. These data were confined almost entirely to manufacturing and, although gathered from all over the country, were preponderantly representative of the states east of the Mississippi and north of the Mason and Dixon line. The Board's data indicated a wage index for the middle of 1923 about 14.4% higher than for the average of 1922. As soon as practicable, the Council secured wage data from its members covering policy years 1921 and 1922, and the last six months of 1923 calendar year, and the carrier figures were used for all states for which they were available in time. The wage increase indicated by the Board's data was found to be about 50% too high for our purposes* even for the northeastern states and about treble the correct (for our purposes) figure for the southeast, the Rocky Mountain states, and California. The company wage data indicated little if any wage increase for the west central and southwestern states.

The translation of the 1921 loss ratio to the manual rate basis in "non-supervised" states was accomplished by applying manual rates to the actual classification payrolls as reported in Schedule Z. The payrolls were not available for policy year 1922, but the

*This is no reflection upon the intrinsic correctness of the Board's data.

(collected) premium as reported in the loss ratio data was raised to the manual basis by applying the ratio of "manual to collected" derived from the 1921 calculation. In such states the difference between collected and manual not accounted for by the merit rating plans ran generally between 5% and 10%.

Generally speaking, the rates made effective or proposed as the result of the 1923-24 revision have either explicitly or by implication, involved a projection factor which was the product of a selected increasing cost factor and a wage change factor. Where practically no change in wage levels (from the average of policy years 1921 and 1922 to the last half of calendar year 1923) was observed, the wage change factor was "rounded off" at unity. In other cases it was the projection factor itself which "came out" close to 1.000, and was accordingly forced to the even figure.

The wage change factor was determined statistically. The increasing cost factor, on the other hand, represented the exercise of committee judgment.

The original plans of the Staff contemplated following the projection procedure of the 1920 Rate Revision, namely keying the rates to the latest policy year available, which in this instance implied the use of policy year 1922. No wage change factor was contemplated. For the first few states (principally supervised states) considered, the Rates Committee rejected this basis in favor of the average of policy years 1921-22 with a wage change factor. The non-supervised states were next taken up. By this time loss ratio data brought down to December 31, 1923 were available, and indicated that policy year 1923 loss ratio for these states would probably exceed that of policy year 1922. Partly for this reason, and partly because the statistical data for these states were regarded as less reliable than those for supervised states, it was the opinion of the Staff that the 1921-22 basis should be modified, and the following policy was recommended:

Keying the rates to (a) 1922 or to (b) 1921-1922 (with wage change factor in each case), whichever resulted in the lesser disturbance of existing manual level; with the continuance of previous manual level wherever it fell between (a) and (b).

This plan was generally followed by the Rates Committee and also by the Regional Committees of the Council.

The last states considered in the revision were regulated states. For these states also loss ratio data indicated that 1923 loss ratio

would probably exceed 1922, and the Rates Committee in its proposals for these states reverted to the original idea of keying rates to policy year 1922 with no wage change factor. This change of policy was not accepted generally by the regional committees and independent bureaus, who adhered generally to the indications of policy years 1921-22 with such wage change factor as statistics justified.

We are appending for reference a table indicating for each state for which new rates have been made (or proposed) the projection factor and its basis (see Exhibit D).

TECHNICAL PROBLEMS

Wage Selections

The revision as originally planned hinged upon the trend of wage levels. Individual accident reports from Schedule Z were the only wage data available for policy years 1918-1920 and these were, for many states, inadequate in volume. The data for calendar year 1922, based on payroll audits covering that year, were sufficient in volume but reflected the wage level of *all employees* which is presumably lower than that for *seriously injured employees* only.* The first difficulty was overcome to some extent by study of regional combinations of data, and the second by a reweighting of the wage data for serious cases according to the Schedule Z payroll distribution by industry. The importance of the original wage selections was minimized by the method adopted for determining the projection factor, whereby the wages selected for policy years 1921 and 1922 and for the later half of calendar year 1923 were the only ones affecting rate levels. These latter selections were generally based on adequate wage data, compiled by the carriers, covering all compensable cases.

Limit Factors

Compensation is computed at a stated percentage of wages, subject to monetary weekly maxima and minima. Obviously, the (1) average rate of compensation paid in a given community will seldom be identical with the (2) product of the specified percentage and the average weekly wage. The ratio (1) to (2),

*Both industrial Commission and company statistics indicate that the average wage for serious *injuries* is some 5% higher than for all *injuries*.

i. e., of realized percentage to nominal percentage, is termed the "limit factor".

Limit factors may be computed upon a detailed distribution of wage rates among employees injured but this method is generally impracticable. Assuming a normal wage distribution introduces very little error for law differential purposes, and Mr. Mowbray developed a method of computing limit factors based on this assumption. (*Proceedings*, Vol. IX, Page 208.) The writer devised a "shortcut" application of Mr. Mowbray's method (See Exhibit E) reducing the time of computation materially. Since between ten and a hundred limit factors were required for each state, the resultant saving in time was substantial.

Ratemaking Procedure

Two important changes were made in ratemaking procedure.

(a) Experience was converted direct to New York 1920 level and then to state latest; instead of first to "state latest," then to New York 1920, and finally back to state latest.

This change was made to eliminate one step in the conversion, and also to expedite the selection of national pure premiums.

(b) Pure premiums were selected by three parts, "serious," "non-serious," and "medical," instead of by all six kinds of loss shown in Schedule Z. Simplicity and the wish to avoid "thinning out" the data dictated this change.

CONCLUSIONS

The National Council on Compensation Insurance is now on the eve of a further revision of compensation rates which presumably for many states will become effective as early as January 1, 1925. Accordingly this is by no means an appropriate time to make predictions as to future methods of compensation ratemaking.

We may, however, consider for a moment what are the criteria of a method of making compensation rates.

In the first place, it seems necessary to break up the problem to a certain extent into its component parts. For this purpose, the first division which we would have to make would appear

to be between the medical pure premium and the indemnity pure premium.

With respect to the medical pure premium, there would appear to be three elements which, other things being equal, it would be desirable to study separately.

- 1—wage rate
- 2—accident rate
- 3—cost per case. (ratio of total medical cost to number of compensable cases in Schedule Z).

Similarly, the indemnity pure premium may be broken up into

- 1—wage rate
- 2—accident rate
- 3—duration of disability.

This makes four separate elements to be studied, wage rate and accident rate being an element common to both medical and indemnity pure premiums.

The task before us with respect to each one of these elements is to ascertain if possible the law which governs it. Apparently, we shall know how to utilize the data we have as to the past with respect to any element if one of the following things can be proved:

- 1—that the element is practically speaking, a constant, or
- 2—that it varies in a cycle so that a "moving average" for a certain number of years may be taken as constant, or
- 3—that it is correlated with some other variable either directly or inversely so that its future course can be predicted from a study of such other variable.

The implications of the theory originally proposed for the 1923-1924 revision as respects indemnity pure premiums, were

- 1—the element of duration is constant
- 2—the accident rate is constant
- 3—the wage rate is a variable whose course for the immediate future may be predicted with a satisfactory degree of accuracy.

At this stage premises (1) and (2) cannot be separately tested on a satisfactory basis. Evidently the indemnity pure premium (even when adjusted to a fixed wage rate) cannot be regarded as constant.

In concrete terms, the pure premium for policy years 1921 and 1922, and probably for policy year 1923, has proved so much higher than that for policy years 1918-1920 (as evidenced by the comparison of manual loss ratios) that the use of the 1918-1920 experience without a projection factor was obviously unwarranted.

Furthermore, the wage rate has a way of changing unexpectedly, and our recent past attempts at prediction warrant the statement that wage rates cannot be prophesied. Accordingly, it is desirable to find, if possible, a plan for fixing rate levels which will not involve any premise as to the wage rate of the future.

EXHIBIT A

OUTLINE OF WORKING PROGRAM 1923 RATE REVISION

PRESENTED TO RATES COMMITTEE OCTOBER 18, 1923

At its July meeting the Rates Committee considered and approved the general method of combining experience presented by Mr. Leslie. This method was, in principle, first outlined by Mr. Mowbray.

The complete working program of the Council for the current revision, which includes some steps not covered by the original plan, may briefly be outlined as follows:

(1) POSTING OF SCHEDULE "Z"

Schedule "Z" returns from the individual carriers are first audited then combined for each state, classification and policy year. The combined experience for each classification is then posted to a State Classification Card.

(2) CONVERSION TO NEW YORK 1920

Using appropriate factors, the raw experience on the cards is converted to the level of New York policy year 1920, and the results are posted on the cards. Seven factors are used for each

policy year and each state. These factors are the result of valuing the respective compensation laws upon the American Accident Table and the wage level of the particular policy year and state.

The State Classification Cards are so designed that in any future use of experience, early policy years may be omitted and new policy years added to the total of converted experience. The cards provide space for a second reporting of the experience, or a second conversion of the same data. One of the principal purposes of the cards is to provide a means whereby clerical work once done will be permanently preserved in useable form.

(3) EXPERIENCE EXHIBIT SHEET

The converted experience of each state is added under the following headings:—Payroll, Serious (death, permanent total and major permanent partial), Non-serious (minor permanent partial and temporary) and Medical, all policy years of a given state being combined. The totals are posted upon an Experience Exhibit Sheet, upon which pure premiums are computed.

(4) SELECTION OF PURE PREMIUMS

With copies of the experience exhibit before them, the staff of the Council selects "national" pure premiums and "state exception" pure premiums, all upon New York 1920 level.

(5) REVERSION TO "STATE LATEST"

The selected pure premiums are then *reverted* to state latest level using theoretical factors, which are consistent with those employed in combining the experience. The so-called "state latest" level corresponds to the latest benefit provisions of the compensation law and to the wage level of calendar year 1922 of the individual state. Three factors are used, respectively applicable to Serious, Non-serious and Medical pure premiums; except where the experience basis of the "state exception" is confined to the experience of the individual state, in which case detail factors are applied in order to insure precise results (in the latter case there are seven factors for each policy year, applying respectively to Payroll, Death, Permanent Total, Major Permanent Partial, Minor Permanent Partial, Temporary and Medical).

(6) CORRECTION OF COST LEVEL REPRESENTED BY STATE
LATEST PURE PREMIUMS

The object of the general method of combining experience is to obtain pure premiums which will represent the cost level of the "latest" law and "latest" wages (1922 wages being regarded for "reversion" purposes as "latest"). Theoretically, the "reversion" of selected pure premiums just referred to should accomplish this purpose and practically it will do so for classifications where only the experience of the individual state is employed. Selected pure premiums which result from the combined experience of all states or of a number of states, when "reverted," may not produce the desired cost level, hence a correction must be introduced.

To this end the cost level indicated by the state latest pure premiums (the "reverted" selected pure premiums) will be compared with the cost level resulting from translating the bulk experience (Schedule "Z" summaries) of the individual state, policy years 1918, 1919 and 1920, to "state latest" and the indicated correction will be applied to the selected pure premiums for those classifications where the selection was not based solely on the state's own data. (The pure premiums based entirely on the experience of the individual state require no such adjustment).

In order to determine the cost level of the state latest pure premiums (before they have been corrected) we apply them to the classification payrolls of the state in question, adding for each classification the payrolls for policy years 1918, 1919 and 1920.

(7) PROJECTION FACTOR

There are a number of reasons why our theoretical state latest may not correspond to the actual current cost level.

By our theoretical method we have taken into account law changes and wage changes. We are not able to bring in wages after 1922. We can't predict future wages anyway. Our theoretical method does not reflect changes in accident rate nor does it measure changes in the interpretation and administration of the workmen's compensation laws.

Having gone as far as we can on theory, we propose to compare our results with the best available index as to current cost, which

we believe to be the loss ratio of policy year 1922. Our plan contemplates making the closest estimate we can of this loss ratio and adjusting it for comparative purposes to a Manual rate basis, in the light of the known effect of schedule and experience rating.

NOTE: In states where benefit schedules of the Compensation Act have been amended effective subsequent to January 1, 1922, an appropriate adjustment of the losses will have to be made.

The test described under (6) discloses the "expected losses" produced by applying our *corrected* state latest pure premiums to the classification payrolls of the individual state. To these same payrolls we will apply the Manual rates which were in effect in 1922 policy year and, in this way, we will obtain a theoretical loss ratio upon the same Manual rate basis as the estimated loss ratio of policy year 1922.

Comparing the actual loss ratio with the theoretical loss ratio we will get an indication of what adjustment must be made in our corrected state latest pure premiums in order to reach a proper cost level upon the assumption that the cost conditions of policy year 1922 are representative of those which will obtain during the period to which the new rates will apply.

(8) MULTIPLIER

Assuming that the schedule and experience rating plans will produce a balance, the multiplier to convert the corrected pure premiums into rates will be the product of the following factors:

- (a) Projection factor
- (b) Expense loading factor

* * * * *

This working program is merely the "modus operandi" of the plan already approved by the Rates Committee. There is brought in, however, the method of determining the "Projection Factor" which was previously referred to the Actuarial Committee for consideration.

The Projection Factor represents merely a "trueing up" of our theoretical results with what we know of actual cost levels.

The principle source of information on loss ratios, from which to determine the "Projection Factor," will be the data now being compiled as a result of our special call of July last. This information is not as complete as we would wish, but we have useable returns from the majority of important carriers, which will give us fairly reliable indications for more states.

The Actuarial Committee, after considering this subject, at its meeting of October 16th and 17th, adopted the following resolution:

RESOLVED: That it is the sense of the Actuarial Committee that the rate level be determined in accordance with the estimated loss ratio of policy year 1922; that such estimated loss ratio be determined in the light of all available information, including the loss ratio data recently reported to the Council, and that the calculation of loss ratios of individual states be reviewed by the Actuarial Committee.

EXHIBIT B
NATIONAL COUNCIL ON COMPENSATION INSURANCE
July, 1923, Special Call for Loss Ratio Experience
 Company _____ State of _____

Year of Issue	RECORD AS OF				
	June 30, 1918	December 31, 1918	June 30, 1919	June 30, 1923	
1918	Net Premiums Written				
	Unearned Premium Reserve				
	Losses Paid				
	Losses Incurred				
1919	Net Premiums Written	June 30, 1919	December 31, 1919	June 30, 1920	June 30, 1923
	Unearned Premium Reserve				
	Losses Paid				
	Losses Incurred				
1920	Net Premiums Written	June 30, 1920	December 31, 1920	June 30, 1921	June 30, 1923
	Unearned Premium Reserve				
	Losses Paid				
	Losses Incurred				
1921	Net Premiums Written	June 30, 1921	December 31, 1921	June 30, 1922	June 30, 1923
	Unearned Premium Reserve				
	Losses Paid				
	Losses Incurred				
1922	Net Premiums Written	June 30, 1922	December 31, 1922	June 30, 1923	
	Unearned Premium Reserve			XXX	
	Losses Paid			XXX	
	Losses Incurred			XXX	
1923	Net Premiums Written	XXX	XXX	XXX	June 30, 1923
	Unearned Premium Reserve	XXX	XXX	XXX	
	Losses Paid	XXX	XXX	XXX	
	Losses Incurred	XXX	XXX	XXX	

EXHIBIT C

NATIONAL COUNCIL ON COMPENSATION INSURANCE
1923 Revision PROJECTION FACTOR

			State _____							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
POLICY YEARS 1918-19-20 AND 21 COMBINED			POLICY YEAR 1921 "Z"							
S.L. Pure Prem.	Average (Pres.) Manual Rate	Loss Ratio (1) ÷ (2)	Actual Losses	Conver. Factor (to State Latest)	Product (4)×(5)	Actual Premiums	Payroll Conver. Factor (to State Latest)	Ratio Adjusted to Manual Premiums	Present Manual Level ÷ 1921 Level	
.837	1.588	52.7	319250	.997	318292	519722	.993	.951	1.000	
(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)		
POLICY YEAR 1921 "Z"			POLICY YEAR 1922							
(7)×(8)×(10) (9)	Loss Ratio (6) ÷ (11)	Actual Losses	Conver. Factor (to State Latest)	Product (13)×(14)	Actual Premiums	Payroll Conver. Factor (to State Latest)	Ratio Adjusted to Manual Premiums	Present Manual Level ÷ 1922 Level		
542675	58.7	427322	1.003	428604	575949	1.007	.951	1.000		
(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)			
POLICY YEAR 1922			INCREASING COST FACTORS							
(16)×(17)×(19) (18)	Loss Ratio (15) ÷ (20)	I. C. F. (21) ÷ (3)	II		III		Wage Factor Change from 1922 Cal. Year to Present			
			Aver. Loss Ratio 1921.22 (12) ÷ (21)	I. C. F. (23) ÷ (3)	Average Loss Ratio 1918.22 4×(3) ÷ 21	I. C. F. (25) ÷ (3)				
609930	70.3	1.334	2	64.5	1.224	5	1.066	1.012		
(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)			
Selected Increasing Cost Factor	Projection Factor (27)×(28)	Loading	Proposed Average Manual Rate (1)×(29)×(30)	Present Average Manual Rate	Ratio (31) ÷ (32)	Present Average Collectible Rate	Ratio (31) ÷ (34)			
1.224	1.239	1.667	1.728	1.588	1.088	1.510	1.144			

NOTES.

- Column (1) obtained by converting Schedule Z total losses and payrolls to State Latest.
 Column (2) obtained by applying current manual rates to classification payrolls.
 Columns (4) and (7) taken from Schedule Z (except in the case of the first few states reviewed, for which loss ratio data were employed.)
 Column (9) (a) where loss ratio data were used, this value was based on estimates furnished by rating offices as to the effect of schedule and experience rating on premium volume.
 (b) where Schedule Z was available, this ratio was obtained by comparing reported (collected) premiums with manual premiums (obtained by applying manual rates to classification payrolls.)
 Columns (13) and (16) generally from loss ratio data (from Schedule Z in the case of last two states reviewed.)
 Column (18) (a) based on rating office estimates, except (b) where corresponding ratio for 1921 (column (9)) was computed on Schedule Z data, in which case the 1921 ratio was used for 1922 also.
 Column (27) The wage change factor is discussed in the body of the paper.
 Column (33) This is the estimated increase in manual rate level.
 Column (35) This is the increase in collectible rate level, as estimated upon the assumption that the new experience and schedule rating plans, generally made effective concurrently with the new rates, will "balance", i. e., that credits will be offset by debits.

EXHIBIT D

Brought down to October 1, 1924

State	Selected Increasing Cost Factor	Basis of Same	Wage Change Factor	Projection Factor	Ratio of Proposed to Present Manual	Ratio of Proposed to Present Collectible	Effective Date	Action by State Authorities
Alabama	1.023	Average 1921-1922	.967	.989	.940	1.007	March 1, 1924	
California	1.000	2.9 points below average 1921-1922	1.000	1.000	.956	1.004	Sept. 30, 1924	
Colorado	1.250	5.1 points below average 1921-1922	.924	1.155	1.121	1.150	July 1, 1924	
Connecticut	1.038	5.6 points below average 1921-1922	.963	1.000	.900	1.065	June 1, 1924	
Georgia	1.088	Average 1921 and 1922	.965	1.050	1.203	1.289		X
Idaho	1.150	4.4 points below average 1921-1922	.874	1.005	1.182	1.255	Feb. 1, 1924	
Illinois	1.110	Continue present collectible level	.909	1.009	.865	1.000	June 1, 1924	
Indiana	1.238		.946	1.171	.992	1.130	June 1, 1924	
Iowa	1.204	Continue present manual level	.979	1.179	1.000	1.127	July 1, 1924	
Kansas	1.224	Average 1921 and 1922	1.012	1.239	1.088	1.114	June 1, 1924	
Kentucky	1.247	1922	1.000	1.247	1.050	1.150		X
Louisiana	1.264	Continue present manual level	1.000	1.264	1.000	—	Sept. 1, 1924	
Maine	1.126	Average 1921-1922	.969	1.091	1.012	1.124	July 1, 1924	
Maryland	1.300	Approximate 1922. 5 points above average 1921-1922	.933	1.213	1.137	1.236	Jan. 1, 1924	
Massachusetts	..	Projection Factor Sel. by Massachusetts Rating and Inspection Bureau	—	.977	1.050	1.140	Dec. 31, 1923	
Michigan	1.223	1922	.929	1.136	.916	1.095	June 1, 1924	
Minnesota	1.000	2.3 points below average 1921-1922	1.000	1.000	—	—		X
Montana	1.102	Continue present manual level	1.000	1.102	1.000	1.051	June 1, 1924	
Nebraska	1.177	Average 1921-1922	.894	1.170	1.070	1.188	June 1, 1924	
New Hampshire	.877	Continue present manual level	.921	.808	1.000	.997	July 1, 1924	
New Jersey	1.143	Approximate average 1921-1922	.936	1.070	1.079	1.079	July 4, 1924	
New Mexico	1.307	Continue present manual level	1.000	1.307	1.000	.949	June 1, 1924	
Oklahoma	1.250	6.4 points below average 1921-1922	.921	1.151	1.211	1.256		D
Rhode Island	1.067	Approximate average 1921-1922	.937	1.000	.885	1.033	June 1, 1924	
South Dakota	1.175	Continue present manual level	1.000	1.175	1.000	1.106	June 1, 1924	
Tennessee	1.102	Average 1921-1922	.964	1.062	1.326	1.421		D
Texas	..	Projection factor of unity sel. by Texas Fire Ins. Commission	—	1.000	1.177	1.252	April 1, 1924	
Utah	1.300	5.7 points below average 1921-1922	.909	1.182	1.165	1.196		X
Vermont	1.116	1922	.946	1.056	.983	1.102	July 1, 1924	
Virginia	1.200	1.4 above average 1921-1922	.934	1.121	1.064	1.064	Jan. 1, 1924	
Wisconsin	1.104	Average 1921 and 1922	1.000	1.104	1.131	—	Sept. 1, 1924	

X—means pending. D—means disapproved. All others—approved or no approval required.

THE COMPENSATION RATEMAKING PROBLEM

EXHIBIT E

NATIONAL COUNCIL ON COMPENSATION INSURANCE
1923 Revision

STATE _____

LIMIT FACTOR
CALCULATION

SHEET _____

No. OF SHEET _____

*TABLE		1	2	3	4	5	6	7	8	9	10	11	12	13		
Rate to Average %	(A)	(B)	CLASS OF INJURY	Compensation Law as of	Nominal % of Compensation	Minimum Weekly Compensation	Maximum Weekly Compensation	Minimum Effective Weekly Wage (0 = 0)	Maximum Effective Weekly Wage (3 = 15)	Policy Year	Average Weekly Wage	Ratio to Average (8) ÷ (9)	Maximum (7) ÷ (6)	Minimum %	Ratio Adjusted to Normal %	Maximum %
10	.02	0														
15	.06	1														
20	.14	2														
25	.32	7														
30	.65	17														
35	1.24	37														
40	2.20	76														
45	3.66	142														
50	5.75	248														
55	8.56	401														
60	12.14	616														
65	16.48	898														
70	21.52	1251														
75	27.13	1672														
80	33.15	2154														
85	39.39	2684														
90	45.68	3250														
95	51.85	3856														
100	57.76	4427														
105	63.31	5010														
110	68.41	5673														
115	73.03	6104														
120	77.15	6599														
125	80.77	7051														
130	83.91	7459														
135	86.61	7824														
140	88.91	8140														
145	90.86	8429														
150	92.49	8673														
155	93.85	8884														
160	94.95	9065														
165	95.81	9219														
170	96.68	9350														
175	97.31	9460														
180	97.82	9552														
185	98.21	9630														
190	98.58	9694														
195	98.86	9749														
200	99.08	9793														
205	99.26	9830														
210	99.41	9861														
215	99.53	9888														
220	99.63	9910														
225	99.71	9928														
230	99.77	9942														
235	99.82	9954														
240	99.86	9963														
245	99.89	9971														
250	99.92	9978														
255	99.94	9983														
260	99.96	9988														
265	99.98	9994														
270	100.00	10000														

14	15	16	17	18	19	20	21	22
(B) for (13) From Table*	(B) for (13) From Table*	Difference (15) - (14)	(A) for (13) From Table*	(A) for (13) From Table*	Difference 100.00 - (18)	PRODUCTS (10) x (17)		Limit Factor (10) ÷ (20) x (21)
							(11) x (19)	10.000