RECENT DEVELOPMENTS IN NEW YORK COMPENSATION RATE MAKING

BY

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At the November 1939 meeting, a paper entitled "The Practice of Workmen's Compensation Rate Making as Illustrated by the 1939 Revision of New York Rates" was presented by Mr. C. M. Graham.

The main purpose of this paper is to point out the important changes in method which occurred in the 1940 New York rate revision. To those in close contact with the Actuarial Committee of the Compensation Insurance Rating Board this may be an old story, but to others who wish to follow the latest developments in Workmen's Compensation rate making these remarks may be of interest.

A. Composite Year of Unit Statistical Plan Experience

The most important change was in the method of rate level determination. For many years rate level changes in New York had been computed from the loss ratios produced by the New York Semi-Annual Loss Ratio Data. Various disadvantages were present in this loss ratio method: (1) An uncontrolled element of loss reserves caused considerable fluctuation because some carriers may employ one basis in setting up reserves while others use another, and some may vary their methods from year to year; (2) favorable supplementary occupational disease experience and catastrophe experience which have tended to depress the general rate level have been included; whereas one or more years of poor experience could have had a serious adverse effect on the rate level stability; and (3) although the permissible loss ratio for ex-medical risks would average somewhat lower than for statutory medical coverage, no adjustment could be made for risks written on an ex-medical basis.

The new method was based on the use of a composite policy year of experience reported under the Unit Statistical Plan. This consisted of the policy year from July, 1937 to June, 1938 inclusive, using experience from Schedule "Z" for the last six months of

policy year 1937, and the original reports and all available corrections for the first six months of policy year 1938. It would, under the Unit Plan of monthly reportings, have been possible to use any twelve-month period, but June is the latest available month at the time of the New York rate revisions, and it so happens that the same manual rates are in effect during this July-June period. Mr. R. P. Goddard, in his paper "Policy Year Modification of Losses" in Volume XXVI of the *Proceedings,* pointed out the fact that the policy year is not the smallest unit of experience available and suggested other situations where monthly data could be advantageously employed.

All payrolls were extended by classification at manual rates excluding the general occupational disease and catastrophe loadings which were applied separately. The premium at 4/1/40 collectible rates was obtained by removing the combined offsetting adjustment factors and applying the proper development factors.

The losses, with catastrophe losses and certain general occupational disease losses shown separately, were summarized by kind of injury and then law amendment and development factors were applied. Cases of Federal classes under the United States Longshoremen's and Harbor Workers' Act were handled separately since separate law amendment factors apply. In order to obtain an adjustment for risks written on an ex-medical basis, the ex-medical payrolls were extended by classification at the July 1, 1939 selected medical pure premium multiplied by .962, which factor was obtained as follows:

$$\frac{1.019}{1.012 \times 1.043 \times 1.003} = .962$$

where 1.012 is the Security Funds factor, 1.043 the contingency loading factor and 1.003 the Reopened Case Fund law amendment factor in the July 1, 1939 total rate level factor of 1.019. This produced a figure for expected medical losses on ex-medical risks if they had been written on a statutory medical coverage basis. This adjustment was made in order to place the experience used for rate level determination purposes on a full coverage basis; the ex-medical payroll experience had already been extended at full medical rates.

The development factors were originally based on two-year arithmetical averages, but it was felt that unusual circumstances

had entered into their determination, producing unusually high factors quite out of line with actual current development. Subsequent discussion of this problem produced the suggestion that one-year development factors (i.e., based on policy year 1936 for development from first report to second, 1935 from second to third, and 1934 from third to fourth) be used in this transition year, but that two-year factors be used in the future to maintain a desirable degree of stability.

Table I below summarizes the experience for the composite year July, 1937 to June, 1938 inclusive:

TABLE I

WORKMEN'S COMPENSATION — NEW YORK
INDICATED RATE LEVEL CHANGE EFFECTIVE JULY 1, 1940
Based on Composite Year of Unit Statistical Plan
Experience — July, 1937 through June, 1938

Coverage	Prem. at 4/1/40 Collectible Rates	Incurred Losses (Developed Basis) on 7/1/39 Law Level	Loss Ratio (3) ÷ (2)	Indicated Change in Collectible Rate Level*
(1)	(2)	(3)	(4)	(5)
(a) Standard	$69,799,424	$37,592,490	53.86%	.916
(b) General O.D.	731,802	20,003	2.73	xxx
(c) Sub-Total (a) + (b)	70,531,226	37,612,493	53.33	.907
(d) Catastrophe	409,886	16,297	3.98	xxx
(e) Total (c) + (d)	70,941,112	37,628,790	53.04	.902

* $\frac{(4)}{60.0\% - 0.0} \times 1.012 \times 1.008$
Contingency Loading = 0.0%
Security Funds Factor = 1.012
Law Amendment Factor = 1.008 for 7/1/40 amendment to Section 25a — Reopened Case Fund.

Inasmuch as general occupational disease and catastrophe premiums are obtained by specific loadings on the manual rate, it was felt they should be handled separately, but the Committee reached the conclusion that the general O.D. experience should be included in determining the rate level. The figure of $20,003 shown in Table I for general O.D. losses represents only dust disease losses for classes without specific occupational disease rates. All of the remaining general O.D. losses were included in the $37,592,490 figure for standard coverage losses because it would have been

difficult to segregate the data for diseases, other than dust diseases, which were made compensable by an amendment to the Workmen's Compensation Act effective September 1, 1935 and which are provided for by the one percent loading. Certain kinds of occupational diseases have been compensable for years and the effect of the 9-1-35 law amendment was to extend the benefits of the Compensation Act to all other types of occupational disease cases. Obviously, it would be very difficult to distinguish, for statistical purposes, between cases previously covered and those newly covered by the broad extension of the Act.

On the other hand, it was concluded that a single year of catastrophe experience is not indicative and that this experience should be excluded from the rate level calculations in order to avoid fluctuation and distortion from year to year. The Committee voted to continue for the present the existing method of determining the general occupational disease and catastrophe loadings. The .907 figure was adopted by the Actuarial Committee and approved by the New York Insurance Department.

B. "k" Factor in Loss Constant Calculations

Another change instituted in the 1940 rate revision was the introduction of a *"k"* factor in the formulae for the calculation of loss constants and offsetting adjustment factors to give consideration to the fact that not all risks over $500 annual premium size are subject to experience rating.

"k" is defined as the proportion of premium for risks over $500 which is subject to experience rating. The following test was used to determine the *"k"* values:

TABLE II

WORKMEN'S COMPENSATION — NEW YORK
Policy Year 1937 — First Report

Industry Group	Earned Premium— All Risks Over $500	Earned Premium— Experience Rated Risks Over $500	Ratio (3)/(2)	Adopted "k" Value
(1)	(2)	(3)	(4)	(5)
Manufacturing	$19,072,147	$17,162,337	.900	.90
Contracting	14,939,071	9,741,793	.652	.65
Federal	1,348,738	1,196,548	.887	.90
All Other	19,861,943	16,671,403	.839	.85

Test of earlier years produced approximately the same results, showing that these factors are relatively stable.

The result is accounted for by variation in the premium of individual risks from year to year, new enterprises, changes in ownership barring the use of the past experience for rating purposes, and the statistical practice of assigning short term risks to premium size group on the basis of the projected annual premium.

In the formula for the offsetting adjustment factors, the average credibility (z) and the 1939-40 credit off-balance of the experience rating plan (b_1) were modified by the "k" factor as follows:

$$a_2 = \frac{e - k\,z + k\,b_1}{1 - k\,z}$$

The expected credit off-balance (b_2) was modified by the "k" factor to produce the expected final modification of all risks over $500.

$$\text{mod.} = 1. - k\,b_2$$

C. *Test of Loss Constants and Offsetting Adjustment Factors by Class Industry Group*

An interesting test was recently made by the Actuarial Department of the Compensation Insurance Rating Board with respect to loss constant calculations on a class industry group basis as against the present risk industry group method. Although the offsetting adjustment factors are determined on a risk industry group basis, they are applied by classification in determining manual rates, and the question arose as to whether this produces a significant difference in the final results.

The following table shows conclusively that the amount of premium in any risk industry group which is transferred into a different class industry group is sufficiently offset by premium passing in the opposite direction so that the effect of applying the offsetting adjustment factors on either basis is approximately the same.

TABLE III

WORKMEN'S COMPENSATION — NEW YORK

TEST OF REALIZED OFFSETTING ADJUSTMENT FACTORS FOR LOSS CONSTANTS AND EXPERIENCE RATING PLAN OFF-BALANCE

Based on Experience of Policy Years 1935-1937
Underlying July 1, 1940 Loss Constant Calculations

Industry Group	Total Premium at Full Proposed Rate*		7/1/40 Adopted Offsetting Adjustment Factors	Total Premium by Risk Ind. Gr. with Offsetting Adjustment Factors Applied by Class Ind. Gr.	Average Offsetting Adjustment Factor (5)÷(2)	Ratio: Realized ÷ Adopted (6)÷(4)
	by Risk Ind. Gr.	by Class Ind. Gr.				
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mfg.	$ 58,772,897	$ 54,274,383	.9842	$ 57,923,879	.9856	1.001
Contracting	37,829,946	40,078,841	1.0408	39,285,126	1.0385	.998
Federal	4,451,336	4,817,142	1.0000	4,447,222	.9991	.999
Serv. P.C.	2,720,660	2,963,148	1.0000	2,720,428	.9999	1.000
All Other	80,929,746	82,244,842	.9807	79,518,522	.9826	1.002
Sub-Total	184,704,585	184,378,356	.9949**	183,895,177	.9956	1.001
Window Cl.	461,356	787,585	1.0000	461,119	.9995	1.000
Total	$185,165,941	$185,165,941	..	..	..	..

* Prior to application of Offsetting Adjustment Factors for (1) Loss Constants and E. R. Plan Off-Balance and (2) Additional Premium from $5.00 Expense Constant.

** Average offsetting adjustment factor obtained using column (2) as weights.

We can conclude from this study that any distortion produced by applying risk industry group offsetting adjustment factors on a class industry group basis is negligible.

The 1940 loss constant calculations were then reproduced using payrolls and losses with the industry group determined by the classification itself rather than by the governing classification of the risk. Several obvious difficulties presented themselves, viz., that the number of risks, average credibility, and the credit off-balance from the experience rating plan are available only by risk industry group. Also, while the calculation of offsetting adjustment factors by class industry group might be more logical, it would be quite impractical to attempt to apply loss constants by classification. However, a comparison of the offsetting adjustment factors and loss and expense constants derived by these two methods follows:

TABLE IV

Industry Group	Offsetting Adjustment Factors Derived on the Basis of		Loss and Expense on the Basis of Constants Derived	
	Risk Ind. Gr.	Class Ind. Gr.	Risk Ind. Gr.	Class Ind. Gr.
Manufacturing	.9842	.9814	$24	$23
Contracting	1.0408	1.0372	28	32
Federal	1.0000**	1.0000**	28*	32*
Servants P.C.	1.0000**	1.0000**	5**	5**
All Other	.9807	.9846	15	14

* Adopted same as Contracting Industry Group.
** Adopted on basis of judgment.

It is believed that the present method of determining loss constants on a risk industry group basis is a more practicable and satisfactory method from all standpoints, and no change is warranted at the present time.

D. New York Expense Loading

In view of various proposals now under discussion which would affect expense loadings, it might be appropriate at this point to give a brief history of the expense loading in New York workmen's compensation rates. Prior to May 1, 1928, the permissible loss ratio was 60%, leaving 40% distributed as follows for the company expenses:

Acquisition	17.5%
Taxes	2.5
Claim Adj.	8.0
Inspection	2.5
H.O. Admin.	7.5
Payroll Audit	2.0
	40.0

On May 1, 1928, the loss and expense constant program was adopted, a $5.00 expense constant being applied to all risks whose annual premium was less than $400 (changed to $500 effective July 1, 1934). Although this did not change the permissible loss ratio for the total premium volume, it created a 60.5 permissible loss ratio for printed manual rates or a reduction of 00.83% in the proposed rates, determined as follows:

$$\frac{60.0}{60.5} = .9917$$

The 00.83% was distributed as follows:

Acquisition	17.5% × .0083	= 0.15%
Taxes	2.5 × .0083	= 0.02
Administration } Payroll Audit }	$\frac{0.83\% - 0.17\%}{2}$	= 0.33 0.33 0.83

Therefore, the revised percentage of the manual rates which would have been determined by use of a 60% permissible loss ratio totalled 39.17% and the percentage of final revised manual rates was 39.50%, as follows:

Acquisition	17.5%	− .15%	= 17.35%	÷ .9917	= 17.50%
Taxes	2.5	− .02	= 2.48	÷ .9917	= 2.50
Claim Adjustment	8.0		= 8.00	÷ .9917	= 8.07
Inspection	2.5		= 2.50	÷ .9917	= 2.52
Administration	7.5	− .33	= 7.17	÷ .9917	= 7.23
Payroll Audit	2.0	− .33	= 1.67	÷ .9917	= 1.68
	40.0		39.17	.9917	39.50

This 60.5 permissible loss ratio was in effect until the 1935 rate revision, at which time the 17.5% provision for Acquisition was separated by the Superintendent of Insurance into 15.0% for Acquisition and 2.5% for Industrial Commission Assessment and Social Security Taxes. Also, a loading of 1.012 for the 1% tax which stock and mutual companies must pay into their respective Security Funds entered into the rate structure, which was determined as follows:

$$\frac{1.0\%}{100\% - (15\% + 3.5\%)} = 1.2\%$$

The latter is a temporary factor which will drop out of the rate structure at some future date, but in the meantime the permissible loss ratio for the total premium volume was reduced to 59.3% (.600 ÷ 1.012 = .593). The permissible loss ratio underlying the printed manual rates became 59.8% (.605 ÷ 1.012 = .598). The complement of this figure, 40.2%, is the expense loading underlying the present printed manual rates, distributed as follows:

	In Total Premium Volume (Including L. & E. Constants)			In Printed Manual Rates (Excluding L. & E. Constants)		
Acquisition	15.0%		= 15.0%	15.00%		= 15.0%
Taxes	2.5	+ 1.0%	= 3.5	2.50	+ 1.0%	= 3.5
Claim Adjustment	8.0	÷ 1.012	= 7.9	8.07	÷ 1.012	= 8.0
Industrial Comm. Assessment & Soc. Security Act Taxes	2.5	÷ 1.012	= 2.4	2.50	÷ 1.012	= 2.4
Inspection	2.5	÷ 1.012	= 2.5	2.52	÷ 1.012	= 2.5
H. O. Administration	7.5	÷ 1.012	= 7.4	7.23	÷ 1.012	= 7.1
Payroll Audit	2.0	÷ 1.012	= 2.0	1.68	÷ 1.012	= 1.7
	40.0		40.7	39.5		40.2