OBSERVATION OF THE TREND OF WAGES AND EMPLOYMENT BY PAYROLL AUDIT DATA

BY

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In March, 1922, a plan for collecting accurate wage and employment statistics was put into operation by the National Council on Workmen's Compensation Insurance. Data have been accumulating since that time and the first bulletin giving comparative figures for the State of New York has recently been issued. It is the purpose of this paper to bring before the members of the Casualty Actuarial Society the methods and results of this plan.

The Importance of Wage Levels in Workmen's Compensation Ratemaking

The experience upon which workmen's compensation rates have been based at each revision has always been obtained from Schedule "Z". Due to the present methods of accounting, two years must elapse before Schedule "Z" for any particular policy year is available. The experience, for example, for policy year 1920 is just now becoming available in 1922. It is obvious that between the time represented by the experience and the time when it becomes available, changes in wage levels may have taken place. These changes in wage levels tend to vitiate the experience unless they can be measured. The payrolls indicated by the experience may be materially changed because of a change in wage level and likewise the losses, which are based upon a percentage of the injured employee's wages, may also be changed. In view of this lag in securing experience statistics for workmen's compensation ratemaking, authoritative data showing the recent trend in wages and in employment and industrial conditions generally are of great importance in ratemaking and are vitally necessary for the use of committees when rates are under consideration.

Information Available Before the 1920 Revision and at the Time of the 1920 Revision

Prior to the 1920 revision very little wage data were available. The problem of bringing experience to the level represented by current conditions had to be met therefore, wholly by the use of judgment. Factors were inserted in the rates which were supposed to measure the changes that had taken place in wage levels and industrial conditions. It was generally understood that the use of this type of factor in the 1920 revision would be avoided. At the same time it was admitted that from the years represented by the experience (1916-1917 policy years) to the year to which the rates would be applicable (1920) a great many changes had taken place which would have to be measured. These changes were measured in the 1920 revision by the use of so-called "projection factors" (See Actuarial Problems of the 1920 Revision of Workmen's Compensation Insurance Rates—A. H. Mowbray—Proceedings Vol. VI page 250).

Wage Data Needed for Compensation Ratemaking

The calculation of "projection factors" necessitated the use of some judgment, although they were more firmly based on experience than were the factors used in earlier revisions. Even at the time of the 1920 revision no authentic wage data which would show the current level of wages were available.

The problem of determining a suitable method for keeping track of the trend of experience so that the rates might be more promptly adjusted to meet changing conditions was referred early in the 1920 revision to the Actuarial Committee of the National Council. After extended consideration, the Actuarial Committee reported that, in its judgment, no more satisfactory way of solving this problem could be had than that afforded by the annual application of the "projection factor" test. Subsequently, the matter was informally discussed among the members of the Actuarial Committee and an outline of a plan for securing accurate wage statistics, at a minimum expense and trouble, which would be very nearly up to date, was submitted to the Committee.

Wage Data Which the New System is Designed to Secure

The new system is designed to secure data directly from actual compensation insurance business giving definitely and in classified form, the recent trend of wages. This will furnish a suitable basis for determining the probable future trend of wages. The system is designed to secure wage and employment data by classifications at intervals of one year. It is expected that a study of the data combined by months will give for each state practically a running average of weekly wages by industries. By a comparison of the number of employees during the first week of the policy period with the number during the last week, when a large group of policies of the same expiration date are studied, it will be possible to show the extent of employment and unemployment at a given time as compared with the same period in the preceding year.

Methods and Difficulties of the New System

The system provides for the printing of blanks by the National Council (see Appendix A) which are supplied to the carriers without cost. These blanks are padded in blocks of 100 blanks (50 pairs) together with a carbon sheet for use with each pad. These pads are distributed by the carriers to their payroll auditors who are required to prepare and transmit to the home office in duplicate a report, as called for in the blank, for each policy audited. The original of the two copies returned by the auditor to the home office is kept by the carrier and the duplicate forwarded to the office of the National Council, which undertakes the compilation and analysis of these data.

It will be noted upon reference to the blank that the data furnished are for two separate weeks which in most cases are one year apart. The following instructions for filling out the blank will explain the method of securing the statistics and the use of the blank. These instructions are printed on the cover of each pad distributed so as to be available to the payroll auditor at any time.

"The blank shall in each case, for purposes of identification, show the name of the carrier and policy number, the state in

which the operations of the risk are carried on and the date of the audit. On the upper half of the blank shall be shown by classification the number of employees and weekly payroll for the first week of the policy year for which the audit is made, and on the lower half of the blank the corresponding figures for the last week of the policy year or audit period. The figures are to be taken from the original payroll records of the assured, classified in the same way in which the total audit figures are classified.

"The weekly payroll reported shall be the total weekly payroll for each classification as shown by the payroll books plus the proper proportion of the monthly or semimonthly remuneration paid foremen, superintendents and other workers who may be paid by check. The number of employees shall be determined by adding together the number of employees shown for each day upon which work was done and dividing by the number of such days, for this purpose counting partial days as full days (since the number of employees would be entered for partial days as for full days). Ordinarily this divisor would be 6 but will vary in the case of seven day industries and for weeks in which one or more holidays occur. To the total number as so determined shall be added the number of superintendents, foremen, etc. paid by check whose names do not appear on the regular payroll.

"On the line provided for recording the working hours for each week shall be entered the number of normal working hours for the interval into which the particular week falls. This, in general, will be the hours worked in that week, but where a holiday occurred within such week they will ignore the effect of the holiday closing.

"It being the purpose of the investigation to get the comparative trend of wages and employment, note shall be made in the space provided at the bottom of the blank when the payroll for either week was reduced by reason of a holiday intervening or was reduced or increased by reason of reduced hours or overtime work. Such comments are necessary for interpreting the returns received. In any case where the insured's books are so kept that this information cannot be obtained, the blanks shall be returned to the home office together with memorandum of explanation why the information cannot be obtained."

The National Council, upon receipt of this sheet carefully audits the data in order to see that they are consistent for the two periods. The proper coding is entered on the card which is then sent to the punch room where the data are punched on a Hollerith card. The card used in this tabulation is reproduced in Appendix B.

Only the month and year of the final period are punched on

this card. Since comparison of degrees of employment is to be made at periods one year apart, only one date is necessary, the date of the initial period being one year prior to the date punched on the card.

Of course, many reports are received on which the data cover periods at intervals of less than one year due to interim audits or cancellations. For these reports, one card is punched for each period with the proper date and also with a coding in the "Special Items" column. By means of this coding these cards can be eliminated before a comparison of employment is made. It is obvious that, when a comparison of degrees of employment is to be made, it is essential that the date used cover the same risks for each period. If the tabulation is to give data as to average wages at any specific time, the "special item" cards can be included in the tabulation.

One of the first difficulties which arose was to determine how the reports should be made out in the case of a seasonal industry where the policy anniversary fell in the off season. If the payroll reports came in for the busy period only, the data might be misleading and imply that the industry was working under maximum pressure throughout the year unless it were known to be a seasonal industry. It was decided, that it would give a better indication if the same rules were followed in this industry as in other industries and that unless the plant was actually closed down at the time of the audit, the first and last weeks of the audit period should be reported. Assuming that the policy expiration dates are uniformly distributed through the year, this will give indications both of wage trend and of employment conditions throughout the year and at various times during the year which is the purpose of the plan. In cases, however, where the plants are actually shut down at the time of the audit, it was decided that data for a week during the busy season should be reported. Of course, these data could be used to produce average wage indications only, for the corresponding week of the preceding year would be missing unless the home office was able to furnish it from previous records.

Another difficulty arose relative to the reporting of the data where an assured furnished board and lodging. It was decided that the cost of board and lodging should be included in the report.

Still another difficulty was encountered in the case of an assured who maintained no payroll records. The carriers were advised that oral statements should be reported if the auditor was convinced from other evidence of their correctness. It was felt that the size of the risk which kept no payroll records would be very small and the inclusion or exclusion of these reports would have very little effect.

It was expected that when the data were compiled in the office of the National Council there would be sufficient basis for a study of industrial groups if not of individual classifications. When the first tabulation was made, however, it was found that, even by industrial schedules, the data were not sufficiently extensive to form a basis for conclusions. The entire data for each state were then tabulated and these figures analyzed.

Results

The first tabulation for the State of New York is reproduced in Appendix C.* Even this combination of all the experience for the State of New York which was filed at the time the tabulation was made was not extensive enough to go very far in drawing specific conclusions. It showed, however, that average employment conditions in the establishments from which these figures were derived were approximately the same in 1922 as in 1921; that average earnings were about 5 per cent. less in 1922 but that during the first half of 1922 the trend of wages was slightly upward. For comparison with these figures the National Council had the data which are gathered and published by the New York State Department of Labor. Both sets of data showed the same trend as to employment and wage levels, although the National Council average wage figures were higher throughout. This was probably due to the difference in the way the two sets of data were gathered. The National Council data give the rate of earning for a full time worker since the rule provides for reporting the average number of workers for each week reported. The rate of wages is calculated by the New York Department of

*Subsequent to the presentation of this paper, a second tabulation was made and the tabulations for New York, New Jersey and Massachusetts are presented.

Labor by dividing the total earnings by the maximum number working on any day during the week,—that is, the total number of names on the payroll. This method of reporting would tend to decrease slightly the rate of wages. Nevertheless, comparison showed that the National Council data were sound and, on the whole, in line with the Labor Department's data.

Tabulations were made for each state but for no other state were the data sufficiently extensive to issue any bulletin to the carriers. A second tabulation is now being made and it is hoped that this will produce sufficient volume to enable the National Council to issue figures for a number of states.

In addition to this use of the data for comparative studies to be bulletined to the members of the National Council, it has been found to be of value in other respects. For example, a recent amendment to the Georgia Workmen's Compensation Law increased the maximum limit of compensation from $12 to $15 per week and decreased the minimum limit from $6 to $4 per week. A calculation of the effect of this amendment as made by the National Council showed that the cost of compensation under the law was increased about 4%. Due to the age of the compensation law in Georgia, (effective March 1, 1921) no distribution of wages for the state was available and it was necessary for the National Council, in calculating the effect of the amendment, to use a distribution of wages obtained from the states of Tennessee, Maryland, Virginia, Louisiana and Kentucky, which were thought to have a level of wages closely resembling Georgia. The proposed increase was protested by certain interests in Georgia on the ground that, because of the very low wages prevailing in that state, the increase in the maximum limit would be more than offset by the decrease in the minimum limit. A tabulation of the National Council wage data, while not extensive, showed that the average wages for Georgia were abnormally low. Of course, no wage distribution could be obtained from these data but the average wage seemed to bear out the contention of the Georgia interests protesting against the increase.

These data were brought into use in another way in the State Texas where in September, 1922, certain amendments were proposed to the compensation law, the effect of which it was necessary to determine. The latest Texas wage distribution in

the office of the National Council was for the last half of the calendar year 1919. A tabulation of the wage data for Texas showed the average wage during the first half of calendar year 1922 to be about $26. The average wage at the time of the 1919 wage distribution was approximately $23. From these two sets of data it appeared that the Texas wage level was about ten per cent. higher in 1922 than during the last half of 1919. Assuming that the ten per cent. average increase was distributed uniformly on all wages it was possible to bring the 1919 wage distribution to the present level. This change in the distribution produced a limit factor differing from that calculated by using the 1919 wage distribution and therefore made more accurate the calculation of the probable effect of the proposed amendment.

Future Use For New Wage Data

At the present time the plan has been in effect only a little over six months and the data so far are limited but, even in their limited extent, have been found very useful. It is realized that before any definite conclusions can be drawn from the data a wide exposure must be obtained and that a considerable period of time must elapse before the exposure will be available. However, the data already are broad enough to indicate a trend which will be helpful in determining the proper level for any new rates.

It is also felt that these data, giving both the trend of wages and an index of general business conditions through comparative indications of employment and unemployemnt, will be useful for underwriting and other uses in home offices. If the data are broad enough to be tabulated by groups of industries, they will indicate which industries are taking on new employees, and thereby possibly increasing the hazard by bringing in less well-trained workers, as well as where workers are being laid off. Through the explanatory comments which are to be studied and reported by the National Council, it should also become evident where plants are working full time or where only part time.

These data should be useful to the payroll audit departments of the various carriers. A comparison of figures compiled by the carrier's home office from its own experience with the figures of all carriers as compiled and sent out by the National Council

would be valuable to the audit departments in checking up the results of their audits and to the financial department in forecasting the general trend of premium income to the extent that it is effected by changes in business conditions.

As outlined in the opening paragraph, the purpose of this paper is to present the methods and results of this new plan. It is hoped that the discussion of this paper at a future meeting will bring from the members of the Society helpful criticism of the methods used in compiling these statistics. It is believed that the data have justified the work necessary and have proved of such value that the plan should be continued. While the results of the plan have not been as valuable as expected, each tabulation produces a larger volume of experience from which increasingly dependable conclusions may be drawn.

WAGE STATISTICS DATA

(Name of Company)

Copy for Home Office.

Policy No._____ Date of Audit_____

Week ending_____
(First week of policy period)

State	Classification Number	No. Employees		Payroll		

Working Hours per Week_____

Week ending_____
(Last week of policy period)

State	Classification Number	No. Employees		Payroll		

Working Hours per Week_____

Notes and Comments_____

National Council on
Workmen's Compensation Insurance
2-22

APPENDIX A

NATIONAL COUNCIL ON WORKMEN'S COMPENSATION INS.

Carrier	Policy Number	State	Class	Sched.	Group	Exp. Year	Exp. Month	INITIAL PERIOD Number Employees	INITIAL PERIOD Weekly Payroll	INITIAL PERIOD Hrs. Per Week	FINAL PERIOD Number Employees	FINAL PERIOD Weekly Payroll	FINAL PERIOD Hrs. Per Week	Special Items	Counter
1 2	3 4 5 6 7 8	9 10	11 12 13 14	15 16	17 18 19	20	21	22	23 24 25	26 27	28 29 30	31 32	33	34 35 36	37 38 39 40 41	42 43	44 45
0 0	0 0 0 0 0 0	0 0	0 0 0 0	0 0	0 0 0 0	0	0	0	0 0 0	0 0	0 0 0	0 0	0	0 0 0	0 0 0 0	0 0	0 0
1 1	1 1 1 1 1 1	1 1	1 1 1 1	1 1	1 1 1 1	1	1	1	1 1 1	1 1	1 1 1	1 1	1	1 1 1	1 1 1 1	1 1	1 1
2 2	2 2 2 2 2 2	2 2	2 2 2 2	2 2	2 2 2 2	2	2	2	2 2 2	2 2	2 2 2	2 2	2	2 2 2	2 2 2 2	2 2	2 2
3 3	3 3 3 3 3 3	3 3	3 3 3 3	3 3	3 3 3 3	3	3	3	3 3 3	3 3	3 3 3	3 3	3	3 3 3	3 3 3 3	3 3	3 3
4 4	4 4 4 4 4 4	4 4	4 4 4 4	4 4	4 4 4 4	4	4	4	4 4 4	4 4	4 4 4	4 4	4	4 4 4	4 4 4 4	4 4	4 4
5 5	5 5 5 5 5 5	5 5	5 5 5 5	5 5	5 5 5 5	5	5	5	5 5 5	5 5	5 5 5	5 5	5	5 5 5	5 5 5 5	5 5	5 5
6 6	6 6 6 6 6 6	6 6	6 6 6 6	6 6	6 6 6 6	6	6	6	6 6 6	6 6	6 6 6	6 6	6	6 6 6	6 6 6 6	6 6	6 6
7 7	7 7 7 7 7 7	7 7	7 7 7 7	7 7	7 7 7 7	7	7	7	7 7 7	7 7	7 7 7	7 7	7	7 7 7	7 7 7 7	7 7	7 7
8 8	8 8 8 8 8 8	8 8	8 8 8 8	8 8	8 8 8 8	8	8	8	8 8 8	8 8	8 8 8	8 8	8	8 8 8	8 8 8 8	8 8	8 8
9 9	9 9 9 9 9 9	9 9	9 9 9 9	9 9	9 9 9 9	9	9	9	9 9 9	9 9	9 9 9	9 9	9	9 9 9	9 9 9 9	9 9	9 9

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APPENDIX B

APPENDIX C

NEW JERSEY — ALL SCHEDULES

Date of Tabulation	1921 JANUARY First Period No. Emp.	Payroll	Aver. Wage	1922 Final Period No. Emp.	Payroll	Aver. Wage	1921 FEBRUARY First Period No. Emp.	Payroll	Aver. Wage	1922 Final Period No. Emp.	Payroll	Aver. Wage
*	131	4,085	31.18	104	3,453	33.20	166	4,564	27.49	158	4,429	28.03
**	67	1,388	20.72	55	1,258	22.87	42	1,159	27.60	43	1,168	27.16
Total	198	5,473	27.64	159	4,711	29.63	208	5,723	27.51	201	5,597	27.85
	1921 MARCH			1922			1921 APRIL			1922		
*	737	18,615	25.25	780	18,419	23.61	2,061	56,310	27.32	2,165	54,264	25.06
**	545	14,686	26.95	571	13,050	22.85	1,326	31,932	24.08	1,254	29,295	23.36
Total	1,282	33,301	25.98	1,351	31,469	23.29	3,387	88,242	26.05	3,419	83,559	24.44
	1921 MAY			1922			1921 JUNE			1922		
*	1,720	41,598	24.18	2,044	52,468	25.66	316	7,962	25.19	331	8,219	24.83
**	3,151	79,854	25.34	2,987	75,015	25.11	1,971	54,856	27.83	2,076	57,099	28.97
Total	4,871	121,452	24.93	5,031	127,483	25.34	2,287	62,818	27.47	2,407	65,318	27.14
	1921 JULY			1922			1921 AUGUST			1922		
*	65	1,231	18.93	32	780	24.37						
**	1,872	44,934	24.00	1,906	46,988	24.65	499	13,929	27.91	633	15,853	25.04
Total	1,937	46,165	23.83	1,938	47,768	24.65	499	13,929	27.91	633	15,853	25.04

*Date of Tabulation August 17, 1922.
**Date of Tabulation October 16, 1922.

MASSACHUSETTS — ALL SCHEDULES

Date of Tabulation	1921 JANUARY First Period			1922 Final Period			1921 FEBRUARY First Period			1922 Final Period		
	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage
*	57	1,001	17.56	133	3,136	23.57	210	5,864	27.92	230	5,862	25.48
**	7	146	20.86	13	295	22.69	48	1,311	27.31	27	580	21.48
Total	64	1,147	17.92	146	3,431	23.50	258	7,175	27.81	257	6,442	25.07
	1921 MARCH			1922			1921 APRIL			1922		
*	1,910	48,029	25.14	1,865	48,430	25.96	8,660	206,549	23.85	9,095	215,227	23.66
**	222	5,295	23.85	246	5,586	22.71	5,004	104,826	20.95	5,268	100,378	19.05
Total	2,132	53,324	25.01	2,111	54,016	25.59	13,664	311,375	22.68	14,363	315,605	21.97
	1921 MAY			1922			1921 JUNE			1922		
*	6,398	156,163	24.40	6,320	153,659	24.31	2,145	53,782	25.07	2,311	55,187	23.88
**	4,033	93,336	23.14	3,887	93,272	24.00	4,479	102,816	22.96	4,425	101,660	22.97
Total	10,431	249,499	23.92	10,207	246,931	24.19	6,624	156,598	23.64	6,736	156,847	23.28
	1921 JULY			1922			1921 AUGUST			1922		
*	1	13	13.00	6	128	21.33						
**	4,174	104,171	24.96	4,446	109,563	24.64	933	20,767	22.26	1,002	22,503	22.46
Total	4,175	104,184	24.95	4,452	109,691	24.64	933	20,767	22.26	1,002	22,503	22.46

*Date of Tabulation August 17, 1922.

**Date of Tabulation October 16, 1922.

NEW YORK — ALL SCHEDULES

Date of Tabulation	1921 JANUARY 1922						1921 FEBRUARY 1922					
	First Period			Final Period			First Period			Final Period		
	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage
*	2,622	78,732	29.87	2,657	79,906	30.07	1,387	36,601	26.39	1,412	33,635	23.82
**	236	6,191	26.23	243	6,075	25.00	285	7,691	26.99	338	7,955	23.54
Total	2,858	84,923	29.57	2,900	85,981	29.65	1,672	44,292	26.49	1,750	41,590	23.77
	1921 MARCH 1922						1921 APRIL 1922					
*	3,016	89,307	29.61	2,820	79,357	28.14	10,505	284,443	27.08	10,736	283,450	26.49
**	1,172	35,295	30.12	1,086	33,620	30.96	4,715	121,822	25.84	4,867	125,151	25.71
Total	4,188	124,602	29.75	3,906	112,977	28.92	15,220	406,265	26.69	15,603	408,601	26.19
	1921 MAY 1922						1921 JUNE 1922					
*	8,672	250,665	28.91	8,576	239,010	27.87	1,852	56,891	30.72	1,879	55,425	29.50
**	9,881	274,956	27.83	8,594	231,855	26.98	13,463	360,166	26.75	14,170	383,652	27.07
Total	18,553	525,621	28.33	17,170	470,865	27.42	15,315	417,057	27.23	16,049	439,077	27.36
	1921 JULY 1922						1921 AUGUST 1922					
*	87	3,271	37.60	87	3,135	36.03						
**	12,379	325,305	26.28	13,168	342,242	25.99	1,922	49,937	25.98	2,144	55,289	25.79
Total	12,466	328,576	26.36	13,255	345,377	26.06	1,922	49,937	25.98	2,144	55,289	25.79

*Date of Tabulation August 17, 1922.

**Date of Tabulation October 16, 1922.