A Method Proposed for the Calculation of Liability and Workmen's Compensation Claim Reserves.

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The various methods used or proposed in the past for the calculation of Liability and Workmen's Compensation Claim Reserves have fallen under one of the two general headings mentioned below or have been a combination of these two methods: (1) An estimate of the probable cost of outstanding claims—either by means of average claim costs based upon previous experience or by individual estimate. (2) A reserve of that part of the expected loss payments which has not been paid out up to date of valuation; that is, the excess of a certain percentage of earned premiums over losses and loss expenses paid prior to date of valuation.

As a basis for determining the most desirable method of reserve valuation let us study the good and bad points of each of these general plans.

The first method bases the claim reserve of a company directly upon the record of outstanding claims and, for this reason, it would appear to be the logical solution of the problem. This method is weak, however, when we attempt to apply it to the great number of immature cases arising from the policies issued in the two years preceding date of valuation—particularly those of Workmen's Compensation contracts. To attempt an individual estimate of these undeveloped claims is a practical impossibility. It is also unreliable even to attempt to throw these cases into certain broad groups by nature of disablement. Even if we grant that such a division could be made upon a reliable basis, we are then confronted with the fact that it would be unsafe in the present changing conditions of experience to attempt to fix upon average costs to be used against these broad divisions of outstanding claims by nature of disablement. The weakness of this method as applied to immature cases under Liability policies was shown under the old "notice and suit" method of valuation, first because of inability to obtain a reliable record of the number of notices of accidents received and, second, in the fact that the average notice costs did not follow closely the increased cost resulting from changing conditions. A safe conclusion to make with regard to the first method of valuation outlined above is that it is reliable only when outstanding claims are valued which are of sufficiently long standing to have reached a definite fixed basis. If what might be called immature cases are to be considered, some other method of valuation must be utilized.

The principal advantage of the second method is that it can be applied with results more accurate than under the first method in obtaining the reserve for the immature claims arising from business issued within a few years prior to date of valuation. The value of this method, however, depends first upon a reliable estimate of the proper percentage of earned premiums to be used as the expected loss ratio and, second, upon the assumption that the gross premium basis upon which the business is written by all companies is practically the same. In regard to the first of these two points it should be stated that the plan of using a percentage of premiums based upon the loss ratio under business written from five to ten years previous to date of valuation gives unreliable results. Some percentage which will be a reasonable estimate of the probable ultimate loss ratio for the business under observation should be fixed. In regard to the second point,—that the business of some companies may possibly be written at rates far below the general rate level of other companies,—the method of supervision of rates at present followed in New York and Massachusetts seems to offer a solution so far as Workmen's Compensation business is concerned. In these states the possibility of some companies writing business at cut rates is practically removed. As the policy of state supervision of Workmen's Compensation rates grows—which will probably be the case—the situation with regard to this feature of the second method outlined above should be gradually improved.

As a remedy for the weaknesses of the second method of valuation the "pure premium" method has been suggested. This method proposes the valuation of the payroll which has been exposed up to date of valuation upon a basis of pure premiums—which pure premiums would be understood to be an accurate measure of the amount of money per $100 of payroll which would be expended for losses and loss expense under the business in the particular industrial classification. This method, considered from a theoretical standpoint, is ideal, but, from a practical standpoint, there are several important objections to giving it serious consideration. Briefly, the objections can be outlined as follows: First, it would be an enormous and expensive task to value all of the payroll exposed by industrial classification and by state upon a basis of pure premiums; and, second, there are not sufficient data available as yet to warrant the issuance of a set of pure premiums by industrial classification for all states—particularly a set which an Insurance Department would want to approve as an adequate basis for reserve valuation. There is a further point in this connection that it would be particularly difficult to obtain a set of pure premiums for Liability Insurance in view of the rapidly changing conditions in this line of business. In view of these practical difficulties in applying the pure premium method and, further, in view of the fact that the rate situation is constantly improving as states take up the supervision of rates, a proposal to base the percentage upon the earned gross premiums seems to be the most practical for the valuation of the claims arising from the business written in the years just preceding date of valuation.

The present Liability Claim Reserve Law of New York, which was drawn up by insurance men qualified for the work after careful study of all plans, utilizes the first method outlined above for the valuation of mature claims, and the second method for the valuation of immature claims resulting from business written in the years just preceding date of valuation. In the method proposed below the general plan of the present law will be adopted with minor changes in detail. In the following outline no attempt has been made to put the proposed plan in legal phraseology.

All outstanding Liability and Workmen's Compensation claims under policies issued prior to January 1, 1913, shall be valued by the method outlined in the present law of New York State—except that the individual estimates of outstanding Workmen's Compensation claims shall be made upon the basis mentioned hereafter.

The claim reserve for Liability policies issued after January 1, 1913, shall be calculated separately from that for Workmen's Compensation contracts issued after that date.

The claim reserve for Liability policies issued after January 1, 1913, shall be calculated as follows:

For policies issued in the eleventh and earlier years of business preceding date of valuation the reserve shall be the number of outstanding suits valued at $1,000 per suit.

For policies issued in the fourth to tenth years (inclusive) preceding date of valuation the reserve shall be the number of outstanding suits valued at $750 per suit.

For policies issued in the third year preceding date of valuation the reserve shall be 60 per cent. of earned premiums, less losses and loss expense paid, with a check on outstanding suits at $750 each.

For policies issued in the second year preceding date of valuation the reserve shall be 60 per cent. of earned premiums, less losses and loss expense paid, with a check on outstanding suits at an average cost per suit derived from the experience of all companies—as outlined hereafter.

For policies issued in the first year preceding date of valuation the reserve shall be 60 per cent. of earned premiums, less losses and loss expense paid, with no suit check.

The claim reserve for Workmen's Compensation policies issued after January 1, 1913, shall be as follows:

For policies issued in the fourth and earlier years preceding date of valuation the reserve shall be the total of the individual estimates of the cost of outstanding claims calculated upon the basis mentioned hereafter.

For policies issued in the third year preceding date of valuation the reserve shall be 65 per cent. of earned premiums, less losses and loss expense paid, with a check by individual estimates of outstanding claims calculated upon the basis mentioned hereafter.

For policies issued in the second year preceding date of valuation the reserve shall be 65 per cent. of earned premiums, less losses and loss expense paid, with no check by individual estimate of outstanding claims.

For policies issued in the first year preceding date of valuation the reserve shall be 65 per cent. of earned premiums, less losses and loss expense paid, with no check by individual estimate of outstanding claims.

Except that the percentages of earned premiums to be used for policies issued in the calendar years 1913, 1914 and 1915, while these years are in the three year period just preceding date of valuation, shall be 55%, 60% and 62½% respectively.

Below is given a schedule which shows the valuation method just outlined if it were put into effect at the end of 1915.

1905 and earlier

1906 1907 1908 1909 1910 1911 1912	Present legal method (combined Liab. and Work. Comp.) *except* Compensation claims outstanding shall be valued on new basis of individual estimates.

1913 Liab. — 60 per cent. + suit check at $750.	Work. Comp. — 55 per cent. + individual est. check.
1914 Liab. — 60 per cent. + suit check at Ave. Cost.	Work. Comp.—60 per cent.—no check by indiv. est.
1915 Liab. — 60 per cent. — no suit check.	Work. Comp. — 62.5 per cent. — no check by indiv. est.

The following schedule shows the valuation method as it would appear at the end of 1917:

1906 1907 1908 1909 1910 1911 1912	Present legal method (comb. Liab. and Work. Comp.) except Compensation claims outstanding shall be valued on new basis of individual estimates.

1913 Liab. — suits at $750.	Work. Comp. — Indiv. est. outs. claims.
1914 Liab. — suits at $750.	Work. Comp. — Indiv. est. outs. claims.
1915 Liab. — 60 per cent. — with suit check at $750.	Work. Comp. — 62.5 per cent. — with indiv. est. check.
1916 Liab. — 60 per cent. — with suit check at Ave. Cost.	Work. Comp. — 65 per cent. — *no* indiv. est. check.
1917 Liab. — 60 per cent. — no suit check.	Work. Comp. — 65 per cent. — *no* indiv. est. check.

The method of apportioning unassigned loss expense paid in a particular calendar year to the various years of business under the policies of which the expense was incurred shall be for Liability business—that required in the present law of New York. For Workmen's Compensation business the method of apportionment should take into consideration the relatively shorter period during which this expense is incurred. A distribution is proposed of 40 per cent. to the year of business corresponding to the calendar year of payment, 50 per cent. to the year just preceding and 10 per cent. to the second year preceding.

The average suit costs to be used against the number of outstanding Liability suits based upon policies issued in the second year preceding date of valuation shall be the cost which the combined experience of all companies indicates as necessary for the future settlement of suits of that age. That is, the suit cost to be applied against these cases shall be that which the combined experience of all companies for say five years shows necessary for the liquidation of these cases after date of valuation.

The above reserve method is proposed for the valuation of the liabilities of stock insurance companies. If the same general method is to be applied to the valuation of the outstanding claims of mutual companies, the percentage of earned premium if fixed by law should be based upon a gross premium similar to that charged by stock companies or else a different percentage which will reflect the expected loss ratio under the business of mutual companies should be fixed upon.

The principal changes involved in the method proposed with the reasons for suggesting them are given below:

1. The proposed method provides for the valuation of all business—both Liability and Workmen's Compensation—written prior to January 1, 1913, upon the present legal basis. The reason for fixing this date for applying the new method is, first, that the Annual Statement blank shows the division of premiums and losses between Liability and Workmen's Compensation business beginning at this date, so that the figures for use as the basis for the valuation are easily obtainable; and, second, in order that a company will not be obliged to hold an unnecessarily high percentage of Workmen's Compensation earned premiums under the policies issued in the calendar years 1913 and 1914 until these years are in the sixth year preceding date of valuation. That is, it is proposed to use the method of individual estimate to obtain the reserve for these years of business—after three years have elapsed from year of issue—rather than to require a company to maintain an unnecessarily high percentage of earned premiums (less losses and loss expense) for five years after issuance of contract.

2. In order that the lower loss ratios under Workmen's Compensation business written in 1913, 1914 and 1915—which have

undoubtedly been experienced by the companies—shall be recognized in the reserve a lower set of percentages to be used for these years is suggested—55 per cent. for 1913, 60 per cent. for 1914 and 62½ per cent. for 1915. It is thought that these percentages, although they may overestimate the loss ratios on the business for these years somewhat, if taken with the Liability percentage (60 per cent.), will give a more reliable basis of valuation for the combined business of the companies than the present method which, in the case of some companies, will be but 54 per cent. in the reserve valuation made at the end of 1915.

3. The proposed method as applied to the valuation of the claim reserve under Liability policies issued after January 1, 1913, calls for a percentage of earned premiums for only the three years preceding date of valuation—instead of five years under the present method and also under the method recently proposed by the Committee on Reserves Other than Life of the Insurance Commissioners. The idea in mind in suggesting this change is that the outstanding Liability suits provide a reliable basis for claim reserve under the policies issued in the fourth and fifth years preceding date of valuation. If several years from now the Automobile Liability and other Public lines produce a loss ratio below 60 per cent., there is no necessity for holding this percentage of earned premiums for the five years following issuance of the policies. The number of outstanding suits calculated at $750 per suit should provide a reliable claim reserve for the business issued in the fourth and fifth years preceding date of valuation.

4. The proposed method as applied to the valuation of claim reserves under Liability policies issued after January 1, 1913, calls for a fixed percentage (60 per cent.) of earned premiums instead of using the percentage indicated by the experience of the earlier business of the company—or, in the case of companies which have not been in business ten years at date of valuation, an arbitrary percentage of 54 per cent. or 55 per cent. The unreliability of an average loss ratio based upon experience of business written from five to ten years preceding date of valuation is so generally acknowledged that no argument seems to be necessary upon this point. Conditions and forms of coverage have changed so completely in the Liability field—mainly due to the decrease in the amount of Employers' Liability business exposed—that any reserve based upon a percentage derived from an average loss ratio

on old Liability business is entirely misleading. In view of this fact the provision for losses and loss expense in the Liability gross premium, 60 per cent., is proposed as the proper percentage of earned premiums to be used.

5. The proposed method as applied to the valuation of claim reserves under Liability policies issued after January 1, 1913, calls for a suit check at a cost which the combined experience of all companies indicates as the expected cost of disposing of cases of similar duration against the outstanding suits of the policies issued in the second year just preceding date of valuation. The recommendation of the Committee on Reserves Other than Life is the application of a suit check of $500 per suit against these cases. It would seem best, however, not to adopt a fixed amount of $500 for these suits but to obtain a more accurate figure based upon the experience of all companies—having in mind the probable increase of the number of suits outstanding—by cases yet to be brought—and the consequent necessity for an adequate estimate of the average cost of these outstanding suits.

6. The proposed method as applied to the calculation of claim reserves under Workmen's Compensation contracts issued after January 1, 1913, provides that the percentage of earned premiums, less losses and loss expense, shall be held for the three years preceding date of valuation only. This proposal is in agreement with that of the Committee on Reserves Other than Life. A reserve by individual estimate for the claims arising from the business issued in the fourth and earlier years preceding date of valuation should be reliable—particularly if these estimates are made in a careful and scientific manner. (The method of calculation of individual estimates will be taken up later.)

7. The proposed method as applied to the calculation of claim reserves under Workmen's Compensation contracts issued after January 1, 1913, requires a check by individual estimate to be applied only to the claims arising from policies issued in the third year preceding date of valuation. The method proposed by the Committee on Reserves Other than Life applies a check upon the claims arising from policies issued in both the second and third years preceding date of valuation. It is submitted, however, that because of the undeveloped character of claims arising from policies issued in the second year preceding date of valuation a check by individual estimate of the cost of these claims will be prac-

tically worthless. It will be seen that the last policy issued in the second calendar year preceding date of valuation will have expired only at date of valuation, so that during the six to nine months previous there will have arisen a great number of claims which will not have developed sufficiently at date of valuation to permit a reliable estimate. To make up a check upon that year's business will be a most difficult and expensive task for a company to undertake and one which will in no way be justified by the value of the result obtained. For the same reason an exhibit of the number of cases outstanding and the estimated cost, developing from policies issued in the year of statement is of even less value. No exhibit of the number and estimated cost of outstanding claims resulting from the two years of business just preceding date of valuation should be called for from the companies.

The following method is proposed for the valuation of outstanding Workmen' Compensation claims resulting from the business written in the third and earlier years. All claims payable in annuities which do not involve a life contingency; that is, those which are payable for a term certain, shall be valued upon an interest basis only. All claims which do involve a life contingency; that is, those which will terminate upon the death of the person to whom the compensation is being paid,—but which contain no remarriage contingency—shall be valued upon the basis of mortality and interest. All compensation claims payable in annuities which involve a life contingency together with a remarriage contingency shall be valued upon the basis of mortality, rate of remarriage, and interest. No mortality or remarriage tables or rate of interest have been recommended as a basis for the valuation of these claims as, in the opinion of the writer, this question of the proper basis of valuation of outstanding claims for reserve purposes should be given separate and thorough study. The method of individual estimate of outstanding claims is now proposed. The basis of these estimates can be determined later after more thorough study can be given to the subject.

The valuation of Workmen's Compensation claims of the character just mentioned should be a careful calculation, possibly upon sheets provided for that purpose which will call for the work in detail. Compensation annuities could be grouped by calendar year of expiration and what is known as a mean reserve calculation made. That is, if the valuation were at the end of 1915, all annuities expiring in 1916 could be grouped and the total amount of such weekly payments shown; all annuities expiring in 1917 grouped, etc., and then a factor for the present value of weekly compensation payments for six months, one year and a half, etc., applied to such groups of annuities. For instance, if at the valuation at the end of 1915 the total amount of weekly compensation payments under annuities not involving life contingencies expiring in 1917 were obtained, a factor upon an interest basis, which would be the present value of a weekly payment of $1.00 for one year and a half, should be applied to the amount just mentioned and the total present value obtained. In the case of annuities involving life contingencies or life and remarriage contingencies a more detailed valuation must be made as the age of the annuitant must be taken into consideration.

A detailed calculation of this kind might seem to be an unnecessarily complicated and expensive task. In the writer's opinion, however, the great desirability of placing this large item of Liabilities upon a reliable basis would justify the expense and trouble involved in such a calculation. Some parts of the work would not be particularly difficult as, for instance, the valuation of annuities of certain classes by groups. In other parts of the work, however, it may be necessary to obtain actuarial advice but here, again, the importance of a careful and reliable estimate would seem to justify that step. It should be noted in this connection that the Insurance Law of Great Britain calls for the preparation of the reserve for long standing cases by an actuary or someone qualified for such work. In other words, it recognizes the importance of placing the reserve for long term serious cases upon a reliable and scientific basis.