

A METHOD OF TESTING LOSS RESERVES

BY

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Ever since workmen's compensation laws were first enacted in this country casualty actuaries have been searching for a formula which will correctly compute the ultimate loss to be incurred under both compensation and liability policies. Thus far no one has derived a satisfactory formula. In the meantime claim men have been patiently setting up reserves on each claim in accordance with the merits of the case as disclosed by the claim file. Some of these estimates have been wide of the mark but most of them have been fairly close. In the aggregate results for all companies combined have not been all that could be desired, as outstanding losses have been underestimated. This paper is presented in the hope that it may prove helpful to some of the members of the Society by suggesting a practical method of keeping a control over compensation and liability loss reserves.

A great many words have been written and spoken against setting up loss reserves on the individual case basis. The criticism has been made that two individuals reviewing the same case at one time would probably set up different amounts and that the same individual reviewing the same case at different times might not set up the same amount each time even though there had been no change in the available information. These objections are valid. In setting up reserves on the individual case basis errors are bound to occur. However, the errors are compensating and not cumulative. Some reserves will be too high and some too low but if reserves are conscientiously estimated the total reserve for any line of business should be approximately correct. The fact that the error is compensating is in the writer's opinion one of the strongest arguments in favor of retaining the individual case method of reserving for important lines of business. Moreover it will be recalled that at the time of examination by the various state insurance departments loss reserves are checked individually as well as in total. Reserve totals based on individual estimates can be arrived at without any knowledge of the amount of premiums written or earned.

If a formula is developed which proves to be correct for all companies combined, what assurance have we that it will be cor-

rect for each individual company? If it does not develop correct reserves for each company—new as well as old—it will be valueless. Under workmen's compensation, for example, we have the following items affecting loss reserves differently at different times:

1. Varying coverages granted under compensation acts of different states.
2. Changes in the law of any state.
3. Varying volumes of business by state.
4. Varying wage levels from state to state and year to year.
5. Periods of boom and depression affecting all states.
6. Changes in the instructions given to underwriters as to acceptable business.
7. Gradual liberalization in awards by industrial commissions.
8. Changes in instructions given to claim men who estimate reserves.

All of the foregoing items, except the last, affect the ultimate amount incurred. The development of a formula to measure such a heterogeneous mixture of variables presents a problem which would baffle an Einstein.

Those favoring a formula method of setting up reserves have the same objective as those favoring the individual case method, viz., correct reserves. If reserves are too high, profitable business is lost by non-renewal and, conversely, if reserves are too low unprofitable business is accepted. Whenever reserves are not substantially correct on individual risks, underwriting results are affected adversely. Again, if original reserves deviate materially from the ultimate cost, misleading results by agent will be obtained. It is to the interest of all carriers that each individual carrier maintain correct reserves in order that rates may be made adequate.

The method here suggested applies to reserves set up on the individual case basis. For the purpose of analysis loss reserves may be divided into four groups as follows:

1. Known cases in reserve at the end of any given year, i.e., specific reserves as shown in the financial statement.
2. Known cases not in reserve at the end of any given year but on which future payments will be made, i.e., reopened cases.
3. Unknown cases, i.e., claims incurred but not reported.
4. New cases, i.e., claims incurred and reported after the close of any given calendar year.

If each of the foregoing groups is studied separately, it will soon become evident whether or not adequate reserves are being maintained. By making the divisions recommended it will be possible to locate the cause of any inadequacy. Under the usual organization of a casualty insurance company the claim department should be held to a strict accountability for maintaining adequate reserves under Items 1 and 4. Reserves under Items 2 and 3 should be estimated by the comptroller or other executive who may be responsible for the compilation of the annual statement.

The following procedure is recommended. Reserves outstanding on December 31st of any given year are listed by claim number and posted in Column 8 on the sheet labeled Exhibit "A." At the same time is posted other information which may be needed later such as agent, home office number, policy year and state. Column 7 headed, "Line of Business" is provided to show the various coverages under "liability other than auto." The postings in Columns 1 to 8 are made in ink and after these postings have been checked the information remains unchanged throughout the year. Columns 9, 10 and 11 are posted in pencil and changes are made from month to month as necessary. Column 9 carries the reserve at the end of the period under review. In Column 10 is shown the reserve carried at the previous December 31st for all claims which have been settled during the period. The total paid during the period on claims settled during the period is shown in Column 11. This figure is obtained by cross footing the amounts shown in Columns 12 to 23 for all settled cases. These are identified by a blank line in Column 9. Columns 12 to 23 are posted in ink and show by months the payments made on claims in reserve on December 31st of the previous year. The total at the bottom of Column 12, for example, is not the total loss and allocated loss expense paid during the month of January 1930 but is merely the loss and allocated loss expense paid during January 1930 on claims which were in reserve on December 31, 1929.

After Exhibit "A" has been completed to the end of any desired period it is summarized and the results posted on "Statement No. 1" which is filled in as follows:

Line 1. Claims settled during the period. The number of claims is obtained by counting the number of items in Column 10 of Exhibit "A." The amount is the total of Column 11 in the same Exhibit.

- Line 2. Take the total shown in Column 10 of Exhibit "A."
- Line 3. Saving (or loss) on claims settled during the period. Line 2 minus Line 1 of Statement No. 1.
- Line 4. Payments made on claims outstanding at the end of the period. This amount is obtained by subtracting the total of Column 11, Exhibit "A," from the sum of the totals of Columns 12 to 23 inclusive.
- Line 5. Reserve outstanding at the end of the period. This is the total of Column 9, Exhibit "A."
- Line 6. Sum of the items on Lines 4 and 5, Statement No. 1.
- Line 7. Reserve carried at the beginning of the period for claims outstanding at the end of the period. This is the difference between the totals of Columns 8 and 10, Exhibit "A." The number of claims is found by counting the items in Column 9.
- Line 8. Underestimate (or overestimate) at December 31st for claims still open at the end of the period. This is found by subtracting the total on Line 7 from that on Line 6, Statement No. 1.
- Line 9. Net overestimate or underestimate for all claims combined. This is the difference between the amounts on Lines 3 and 8.

As to the results obtained, each carrier will probably develop tendencies peculiar to itself. However, if reserves are to prove adequate in the final analysis certain general tendencies should be common to all. First, the amount on Line 3 should always be positive. In other words there should always be a saving on settled cases. The amount on Line 8 will probably always show an underestimate. There is nothing alarming about this. If an overestimate is shown for cases still open at the end of the period it will probably be found that a grossly exaggerated reserve is being carried. Reserves, like rates, should be adequate without being excessive. Third, the net result shown on Line 9 should always be an overestimate.

In Statement No. 2 an attempt is made to measure latent liability at the end of any given year in so far as it later becomes known through reopened and incurred but not reported claims. A record of re-opened claims is kept on Schedule "A" sheets properly headed and segregated. A record of incurred but not

reported claims is made from tabulating machine cards in total. No detail is kept in regard to the claims composing this item. Experience shows that the greater part of the incurred but not reported loss is disclosed during the first few months of the year. A test of one company's losses showed that 90% of the total amount of the year's incurred but not reported losses were known on March 31st. On the same date only 75% of the total amount of the company's reopened claims were known. On April 30th, 95% of the incurred but not reported losses were known but not until September 30th were 95% of the reopened claims disclosed. These percentages refer to amounts of incurred loss and not to numbers of claims. Of the total amount of incurred but not reported loss as developed at the end of 12 months only 13.9% was incurred under the lines of business shown in the schedule on Page 5 of the annual statement. The remainder of the 100% was composed of losses incurred under workmen's compensation 53.8%, automobile liability 17.9% and liability other than automobile 14.4%. Although Page 5 of the annual statement does not call for reserves on the lines of business reported in Schedule "P" the amounts for incurred but not reported and reopened claims under compensation and liability should be available before total reserves on these lines can be intelligently estimated.

It was found by the company referred to above that during one year its liability under reopened claims amounted to approximately 55% of the total developed under incurred but not reported. Of the total incurred under reopened cases, workmen's compensation contributed 50%, automobile liability 27%, liability other than automobile 11% and all other lines combined made up the remaining 2%.

To keep a complete check upon the adequacy of reserves at all times it is important to test current reserving. A good method for controlling reserves falling in this group is to compute the average incurred cost per notice by line of business on a calendar year basis and to check this figure against an average incurred cost determined from past experience.

In conclusion it may be stated that while the suggested method of testing reserves may be applied to any line of insurance its chief value will be found when it is applied to the lines reported in Schedule "P." The method is flexible and permits of almost any sub-division which may seem desirable. Tests may be made by

agent, state or policy year if required. The method has been gradually evolved, is simple of application, economical of clerical labor, produces reliable results and is easily understood by those who are not actuarially minded. By depending upon calendar year results corrective action may be taken while many policies are still in force. Of course, it cannot be assumed that reserves are correct at the end of any given period until this system has been in operation two or three years. However, if this method is rigorously applied a condition will soon be reached when it can confidently be predicted that for all practical purposes reserves are reasonably close to the ultimate incurred cost.

STATEMENT OF CLAIM DEVELOPMENTS

FROM JANUARY 1, 1930 TO APRIL 30, 1930

RE: ACCIDENTS OCCURRING AND REPORTED PRIOR TO AND OUTSTANDING AT DECEMBER 31st OF PREVIOUS YEAR

	TOTALS		AUTO LIABILITY Excluding Associated Com- panies' Auto Liability		LIABILITY OTHER THAN AUTOMOBILE		ORDINARY COMPENSATION		All other Lines except Credit, Fidelity, Surety, Assoc. Comp. and Assoc. Auto. P.D.	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
CASES SETTLED IN THE PERIOD										
1	CLAIM AND ALLOCATED CLAIM EXPENSE PAYMENTS, INCLUDING CLAIMS SETTLED WITHOUT PAYMENT						7	1,107		
2	RESERVE CARRIED FOR SUCH CASES AT END OF PREVIOUS YEAR							2,504		
3	UNDERESTIMATE (-) OVERESTIMATE (+)						(+)	1,397		
CASES STILL PENDING AT END OF PERIOD										
4	CLAIM AND ALLOCATED CLAIM EXPENSE PAYMENTS							1,704		
5	RESERVE AT END OF PERIOD FOR CLAIMS AND ALLOCATED CLAIM EXPENSES							18,590		
6	TOTAL OF LINES 4 AND 5							20,294		
7	RESERVE CARRIED FOR SUCH CASES AT END OF PREVIOUS YEAR						8	19,080		
8	UNDERESTIMATE (-) OVERESTIMATE (+)						(-)	1,214		
9	TOTAL UNDERESTIMATE (-) OVERESTIMATE (+) DEVELOPED AT END OF PERIOD PER LINES 3 AND 8						(+)	183		

NOTE A—INFORMATION REGARDING NUMBERS OF CLAIMS IS REQUIRED ONLY ON LINES 1 AND 7
 B—ALL AMOUNTS ARE REPORTED IN DOLLARS ONLY
 C—ALL AMOUNTS ARE NET AS TO REINSURANCE CEDED

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STATEMENT OF CLAIMS RE-OPENED AND INCURRED BUT NOT REPORTED DURING 4 MONTHS ENDING APRIL 30, 1930
RESPECTING LOSSES WHICH OCCURRED ON OR BEFORE DECEMBER 31, 1929, BUT WERE NOT RESERVED FOR ON THAT DATE

INCURRED BUT NOT REPORTED CLAIMS			LINE OF BUSINESS	RE-OPENED CLAIMS		
LOSSES AND ALLOCATED LOSS EXPENSES PAID	RESERVES FOR LOSSES AND ALLOCATED LOSS EXPENSES	LOSSES AND ALLOCATED LOSS EXPENSES PAID AND RESERVED		LOSSES AND ALLOCATED LOSS EXPENSES PAID	RESERVES FOR LOSSES AND ALLOCATED LOSS EXPENSES	LOSSES AND ALLOCATED LOSS EXPENSES PAID AND RESERVED
			Workmen's Collective			
			Accident			
			Health			
			Glass			
			Burglary			
			Boiler			
			Machinery			
			Auto Liability			
			Auto Property Damage			
			Auto Collision			
			Liability other than Auto			
			P. D. other than Auto			
			Workmen's Compensation			
			TOTALS			