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RESERVES FOR REOPENED CLAIMS ON WORKMEN'S COMPENSATION

BY

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INTRODUCTION

Reopening of closed claims occurs in most lines of insurance, but in the case of Workmen's Compensation these reopenings have acquired a major importance because of their frequency and the success with which these reopened claims are pressed.

Most companies make the reserve for reopened claims a part of the reserve for Incurred But Not Reported Claims, calculated at the end of each year for the purpose of the Annual Statement. However, it appears that the methods used for the calculation of the reserves on regular I.B.N.R. claims do not lend themselves readily for estimating the liability arising out of reopened claims. The excellent paper by Thomas Tarbell (see *Proceedings* of the Casualty Actuarial Society Vol. XX) relates the I.B.N.R. reserves to the experience of the immediate past (usually eleven months experience of the current year) modified by current factors such as comparative volume of exposure (the volume of business in force), accident frequency and average claim cost. In the case of reopened Workmen's Compensation claims this method seems largely inapplicable because:

1. Reopenings take place over a long span of time. It will take several years before we know what is the actual number of reopened claims for which we should establish a reserve at the end of the present year. Eleven months experience would just not be sufficient.
2. The present volume of business in force and the present accident frequency do not directly influence the number of reopenings. A claim before it is reopened must be first reported and then closed. Each of these events may be separated by intervals of time of considerable length.

3. The present average claim cost on regular claims is widely different from the average costs on reopened claims, because the latter are very special kind of claims, which have their own averages.

To summarize, the I.B.N.R. claim reserve is established to bridge the natural lag between the occurrence and reporting of an accident, and the I.B.N.R. claims are just a normal run of claims which have not been reported because of the lag. On the other hand the reopened claims are anything but normal, consequently a different approach to the problem is needed. The approach which I would propose can be divided into two parts:

1. Estimating the number of closed claims at the end of a particular year which would be reopened at a later date. We are not concerned with claims closed and reopened during the same calendar year.
2. Estimating the average incurred costs after reopening.

NUMBER OF REOPENED CLAIMS

Consideration was given to relate the number of reopened claims to:

1. The number of open claims at the end of a particular year.
2. The number of claims reported during the latest calendar year.
3. The number of claims closed during a calendar year.

In regard to the numbers of open claims and reported claims, they did not seem to be directly connected with reopened cases and the relations obtained seemed rather unstable. Logically, the best connection should be with claims closed because (a) a claim has to be closed before it can be reopened (b) other things being equal, one would expect that a greater number of closed claims would give rise to more numerous reopenings. The actual results appeared to favor this approach. The mode of relating reopened cases to closed cases was through a development of probability that a claim closed in a particular calendar year will be reopened during the next t calendar years.

Table 1 summarizes the experience of the Standard Accident Insurance Company over the years 1936-1958. The number of closed claims during that period of time exceeded 1,000,000 and the number of reopened claims amounted to over 4,500. The reopened claims are expressed as percentages of claims closed. The reopenings are traced year by year until the end of the eighth year after the year of closing. Admittedly, there can be some claims reopened more than eight years after closing but they are extremely rare. Moreover, cases reopened that late do not appear very successful from the claimants' point of view. During the whole period under consideration Standard Accident paid only two cases reopened more than eight years after closing, the grand total of these payments amounting to $667. Of course, it should be taken into account that most states have time limitations on reopenings and in New York a special fund would take over a case when more than 7 years have elapsed since the date of accident and more than 3 years from the date of last payment; both of these conditions must be met. Consequently under the New York law a case reopened more than 7 years after closing would not affect our reserves.

TABLE 1

RATIO OF REOPENED WORKMEN'S COMPENSATION CLAIMS TO TOTAL NUMBER OF CLAIMS CLOSED

Years of Closing	*Percentage of reopenings occurring after the year of closing in the indicated years*							
	1st	*2nd*	*3rd*	*4th*	*5th*	*6th*	*7th*	*8th*
1936	.482	.062	.034	.017	.007	.002	.002	.002
1937	.470	.061	.024	.009	.007	.005	.005	.000
1938	.434	.046	.023	.012	.003	.003	.000	.000
1939	.416	.099	.020	.015	.009	.003	.006	.000
1940	.388	.041	.024	.006	.009	.009	.000	.009
1941	.340	.058	.025	.009	.016	.007	.000	.000
1942	.356	.045	.014	.010	.008	.006	.000	.002
1943	.328	.035	.030	.017	.006	.004	.000	.000
1944	.341	.054	.031	.018	.005	.008	.000	.005
1945	.342	.064	.043	.014	.023	.003	.006	.000
1946	.396	.102	.015	.002	.000	.009	.000	.002
1947	.359	.061	.022	.010	.004	.004	.004	.002
1948	.253	.032	.027	.012	.006	.005	.005	.000
1949	.207	.041	.019	.009	.015	.002	.004	.002
1950	.242	.052	.024	.018	.011	.002	.002	.000
1951	.281	.064	.026	.004	.006	.002	.002	.000
1952	.323	.065	.042	.011	.004	.004	.004	
1953	.332	.071	.030	.018	.014	.002		
1954	.336	.080	.026	.008	.010			
1955	.331	.060	.027	.005				
1956	.288	.063	.030					
1957	.321	.056						
1958	.386							
Average	.346	.060	.026	.011	.009	.004	.002	.002

Table 2 below summarizes the probabilities developed from figures in Table 1.

TABLE 2

REOPENED COMPENSATION CASES

Year t After Year of Closing	*Probability of Reopening in Year t*		*Cumulative Probability for Reopenings in Year t and Later*	
	Observed	*Theoretical*	*Observed*	*Theoretical*
	1	*2*	*3*	*4*
1st	.00346	.00346	.00460	.00460
2nd	.00060	.00063	.00114	.00114
3rd	.00026	.00023	.00054	.00051
4th	.00011	.00012	.00028	.00028
5th	.00009	.00007	.00017	.00016
6th	.00004	.00004	.00008	.00009
7th	.00002	.00003	.00004	.00005
8th	.00002	.00002	.00002	.00002

In view of the possibility of random fluctuations (due to the very small probabilities involved) distorting the observed figures, it was judged advisable to fit a curve to our data. The fitted curve is $P = .03346t^{-2.45}$ and its values for each year are given in column 2.

Columns 3 and 4 show cumulative probabilities, both observed and theoretical, for the years starting from t up to the 8th year. It is actually these data which are to be used for estimating the number of claims which are closed at the end of the present year and which will be reopened during the next eight years. The procedure is simple:

.00460 $\times$ No. of claims closed during the present year
.00114 $\times$ No. of claims closed during the 1st preceding year
.00051 $\times$ No. of claims closed during the 2nd preceding year
.00028 $\times$ No. of claims closed during the 3rd preceding year
etc.

The sum of these multiplications will give us the desired figure.

Questions could arise whether the obtained figure should not be adjusted for changes in the economic cycle. Frequent statements have been made that there is a close connection between these reopenings and unemployment rates. Table 3 below puts together the 1st year reopening rates and average annual rates of unemployment among the civilian labor force.

TABLE 3

REOPENED COMPENSATION CASES AND UNEMPLOYMENT

Calendar Year	*1st Year Reopenings. % of Cases Closed*	*Annual Rate of Unemployment % of Civilian Labor Force**	*Calendar Year*	*1st Year Reopenings. % of Cases Closed*	*Annual Rate of Unemployment % of Civilian Labor Force**
1937	.482	14.3	1949	.253	5.9
1938	.470	19.0	1950	.207	5.3
1939	.434	17.2	1951	.242	3.3
1940	.416	14.6	1952	.281	3.1
1941	.388	9.9	1953	.323	2.9
1942	.340	4.7	1954	.332	5.6
1943	.356	1.9	1955	.336	4.4
1944	.328	1.2	1956	.331	4.2
1945	.341	1.9	1957	.288	4.3
1946	.342	3.9	1958	.321	6.8
1947	.396	3.9	1959	.386	5.5
1948	.359	3.8			

* These are official figures compiled by the U.S. Dept. of Commerce, Bureau of the Census and U. S. Dept. of Labor, Bureau of Labor Statistics.

The correlation coefficient between these two series of data amounts to +0.69. However, a closer inspection of the figures shows that this is due to pre-World War II figures when the very high unemployment rates were accompanied by relatively high reopenings. If we exclude the figures prior to 1942 we obtain a radically changed correlation coefficient of —0.17; this small negative coefficient is without statistical significance. Two conclusions could be drawn from this: (a) that unemployment ceased to be a factor in reopenings or (b) that only very high unemployment rates would be accompanied by higher reopenings. The writer favors the first view on account of the improved unemployment benefits which seem to compete effectively with the Workmen's Compensation benefits. In addition, he believes that prewar unemployment rates are a thing of the past, consequently he is against adjustments based on anticipated changes in the economic cycle, even if such changes could be accurately forecast.

INCURRED COSTS

The first step is to compute the average incurred costs on claims reopened in the past. Immediately, two major problems will arise:

1. The reserves on reopened cases have an unusually high margin of safety. It seems that the claim examiner's attitude to reopened cases is quite different from his attitude to the usual run of cases. Consequently, when computing costs on reopened claims in the past, it is ab-

solutely necessary to adjust the amounts outstanding by expected development.

2. Because of the relatively small number of cases, a large single case could substantially distort the average. This was eliminated to a considerable degree by the use of a 5-year moving average.

Having obtained these averages, the problem is to relate them to some other values so that the future costs could be estimated. An ideal situation would be if these costs could be related to something simple like the average reserves on open claims or the average incurred cost per reported case. But a considerable lack of stability was encountered. An additional complication was that both those values are subject to development. Again the best results were obtained by looking at the cases closed. The figures are shown in Table 4.

TABLE 4

PAID COSTS ON CLOSED CLAIMS AND INCURRED COSTS ON REOPENED CLAIMS

Five Years Ending	*Paid Per Case Closed*	*Adjusted Incurred Cost Per Reopened Case, Allotted to the Year of Closing*	*Ratio*
1945	$ 61.09	$240.44	3.936
1946	64.72	249.35	3.853
1947	68.53	285.95	4.173
1948	71.12	331.46	4.661
1949	75.22	380.45	5.058
1950	79.71	418.85	5.255
1951	86.14	428.12	4.970
1952	94.79	448.66	4.733
1953	104.12	494.86	4.753
1954	111.93	496.48	4.436
1955	117.89	524.60	4.450
1956	123.33	565.50	4.585
1957	128.04	620.09	4.843
1958	137.19	580.29	4.230
10 Year Average	119.45	535.20	4.481
1941—1958 Average	94.88	417.63	4.402

The reserve on reopened claims can be now easily obtained by applying the average paid costs of the year of closing to the estimated number of claims to be reopened in the future, the claims arranged by year of original closing. The total multiplied by a factor of approximately 4.5 should give us an adequate reserve.

SOME PRACTICAL CONSIDERATIONS

In regard to the number of reopened claims and their allocation to the year of closing, they are relatively easy to obtain and within a few years they would provide us with significant statistics as to the pattern the reopenings follow. However, with regard to average costs the situation is different because the development of reserves has to be taken into account and as mentioned before the reserves on reopened cases have an unusually high margin of safety. An added complication is that generally Workmen's Compensation claims take a very long time to develop. Consequently, there is a need for establishing a mechanical procedure for handling these reopened claims in order to arrive at a good estimate.

Generally, it is not possible to utilize directly the regular loss punch cards for this purpose as (a) they do not have enough space to indicate reopening, date of reopening and the date of closing, (b) we are not interested in the total incurred cost for these claims but only in the costs incurred subsequently to reopening. Therefore, it would be necessary to set up a special set of punch cards for the reopened claims. Each of these cards would initially show the line of business, state, claim number, date (month and year) of accident, date of closing, date of reopening and total paid prior to reopening. There would be also columns for cumulative paid from the date of accident and amounts outstanding. At the end of each year, these reopened claim cards would be matched with regular loss cards in order to obtain the cumulative paid and the latest outstandings. Subtracting from these figures the paid prior to reopening would give us the incurred cost after reopening.

In order to test the reserves on reopened cases one should group the reopened claims by year of reopening and provide for the run-off of the reserves outstanding at the end of that year. Because of the slow development we should observe the changes in incurred cost over a long period of time, at least ten years.

After the system is set up, one is sooner or later confronted with a problem what to do with a claim which is being reopened for the second time. If the second closing and reopening occurred during the same calendar year, then they can be ignored, as there is no penalty to the calendar year's operations. However, if the second reopening occurs after the year of second closing, we will have to establish a second card, because we have there actually two closings and two reopenings with two different incurred costs after reopening, to be allocated as penalties to two different year ends.

CONCLUSIONS

The main conclusion is that reasonably accurate reserves for reopened claims on Workmen's Compensation can be established by basing the estimate on past closed claims and their average payments. This is important because both of these figures can be promptly and easily obtained and in addition they are not subject to future development. In other words they provide us with a firm ground on which to base our estimate. The fact that it has been shown that unemployment (at least in a moderate range) does not

affect noticeably the rate of reopenings, is also of considerable importance. In the past, one of the major difficulties was that the rate of reopenings was assumed to be a function of the rate of unemployment, consequently the actuary forecasting the future course of reopenings found himself usually forecasting the future course of the country's economy. And frankly, this type of forecasting is an unenviable job. Now it could be that before the Second World War the rate of reopenings was connected with the level of unemployment. Fortunately, this connection seems to have disappeared.