

DISCUSSION BY ROY H. KALLOP

Mr. Dropkin is to be congratulated once again for another fine contribution to the Society. His paper, *Size of Loss Distributions in Workmen's Compensation Insurance*, represents a forward step toward establishing an appropriate mathematical model which would adequately describe the distribution of losses by size. If such a model is eventually established it would be of real value in calculating "D" ratios, excess loss premium factors, the self-rating point in experience rating, and other calculations which relate to size of loss.

The detailed statistics of loss distributions by type of injury which were available for California enabled the author to analyze at considerable depth the fitting of a curve to observed loss distributions with special emphasis on the log-normal curve applied to disability losses. A significant achievement in Mr. Dropkin's paper is his use of the Kolmogorov test of the goodness of fit. Although the test does not share widespread popularity with the Chi-Square test, it is, nevertheless, a method which is relatively simple and appears to be more suitable than the Chi-Square test for this particular analysis.

It would be most interesting to study the loss distributions of other states and compare the results with Mr. Dropkin's analysis in California. Unfortunately, we do not have readily available loss distributions by type of injury for the states under the National Council jurisdiction but it is entirely possible that this type of data may be made available in the near future. Before such a study of other states is conducted, however, there are some major obstacles that would have to be overcome.

California has the largest volume of compensation experience and, therefore, is an ideal state to analyze since loss distributions can be developed consisting of a large number of claims incurred within a relatively short period of time. Most of the other states have considerably less volume than California and it would be necessary to compile losses over a much longer period in order to secure a sufficient number of claims to review by type of injury. In fact, a number of states have only a handful of permanent total cases each year. This raises serious doubts as to whether a mathematical model can be established for permanent total loss distributions within a state even over a long period of time. Due to noticeable differences in state benefit scales, wage levels, attitudes of adjudicating claim bodies, etc., regional or countrywide distributions have only limited value.

Another question arises as to the effect that the changes in state

conditions will have on loss distributions during the period under study. For example, law amendments obviously can affect the characteristics of a loss distribution. Changes in wage level may also affect the shape of the distributional curve because of the maximum and minimum limitations on workmen's compensation benefits. A Supreme Court decision applicable to a particular type of injury is another factor to be taken into account. These changes may not appreciably affect a distribution over a short period of time such as Mr. Dropkin has used in his analysis of California data, but such changes could significantly affect loss distributions over a longer period of time which would be required if other states were being reviewed.

The California Unit Statistical Plan requires that all indemnity cases be listed separately regardless of amount. Under the present National Council rules, all claims which have a total loss (indemnity and medical combined) less than \$500 may be lumped together. A good percentage of temporary total cases are under \$500 and, are reported on a combined basis. In addition, there are a number of minor permanent partial cases under \$500. Hence, loss distributions that might be developed for other states would have as its first interval all claims under \$500. This means that a study of the other states would be useful if we are concerned only with the larger loss sizes. This suggests that a mathematical analysis of the upper parts of a loss distribution would involve the theory of extreme values. This could be a good subject for a future paper.

Development of losses beyond a first reporting basis can be significant, particularly for serious injuries. Unfortunately, Mr. Dropkin's analysis had to be confined to first reporting figures, since losses were not available on a per-claim basis on a subsequent reporting basis.

It is hoped that the problems to be faced in analyzing loss distributions for other states can be met with successfully in order that we can augment the very fine work that Mr. Dropkin has initiated in California.

DISCUSSION BY LeROY J. SIMON

We all know what to expect when we read a paper by Mr. Dropkin. We expect to get some new ideas, come interesting information and a careful, precise and correct presentation which mixes both the practical and the theoretical. In his paper, *Size of Loss Distributions in Workmen's Compensation Insurance*, we are not disappointed. The interesting information this time comes in the form of a series of ten actual distributions of losses in *Workmen's Compensation*. One of the significant new ideas that we get from the paper is an introduction to the Kolmogorov