COMMERCIAL PACKAGE POLICIES — RATING AND STATISTICS

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INTRODUCTION

Commercial multiple peril package policies have been in existence since 1958 and at this time are still new enough so that they have not yet really passed beyond the evolutionary or seasoning stage. As a result, they should not be considered as having settled into any rigid or finally determined procedures insofar as rating and statistical plans are concerned, nor should any of the practices brought over from the individual lines of insurance be considered immutable. Having already demonstrated their present and potential importance with a premium volume in 1962 of over $150,000,000, it is vital that the ratemakers give consideration to the best method of handling this business. As a preliminary to discussing this problem, it is necessary to review briefly some of the events and developments of the past decade or so.

BACKGROUND

Prior to the advent of independent action in the regulated lines of property and casualty insurance, rating was strictly in the hands of the various rating bureaus; and while the bureaus were and are the servants of their member companies, an individual company ordinarily became involved in rating only indirectly unless it had representation on one of the bureau steering or advisory committees. Even then its representative might have no part in the actual development of rates and might only be called upon to pass on the recommendations of the bureau technicians. Similarly, the statistical plans were drawn up as a result of board, bureau or industry committee action. Thus, an individual company typically had little active or detailed concern in the mechanics of either statistical or rating plans. If the company used its data classified in accordance with industry statistical plans at all, it was usually for comparison with industry loss ratios both by class and total and with industry premium distributions by geographical or class breakdowns.

The foregoing was typical of the situation at most companies prior to the independent moves starting in various lines in the late 1940's and early 1950's. (Independent is used as meaning actually different in rate, form, or coverage rather than the technically independent filings which are in fact identical to the bureau filings.) However, when a company became different and was no longer running with the pack, it had to prepare itself so that it would have data available to justify its actions and to indicate future courses which it should follow. In other words, when a company became directly involved in ratemaking and in rate level decisions, it had to develop information on which to base such decisions. To accomplish this, it required statistics as described in the following quotation:

"More recently, statistics has usually meant the science (and art) concerned with

the collection, presentation, and analysis of quantitative data so that intelligent judgments may be formed upon them. . . ." [1]

This by-product of independence was first encountered as a major problem by the direct writers in the auto field, and they soon evolved or introduced coding procedures and classifications patterned to meet their own particular needs.

Homeowners: The first major ventures in independence in the multiple line area were, of course, with respect to the Homeowners Policy. The statistical problems of independence in this field were greatly eased by the fact that companies which later became independent participated in the drafting of the original statistical plans, and the final basic plan issued by MPIRO (Multiple Peril Insurance Rating Organization) was drawn along lines which reflected the thinking of more than one segment of the industry. One fundamental concept, the indivisible premium approach, prevailed at that time as the basis of industry statistical data and greatly simplified the problem of coordinating independent plans with standard industry plans. Subsequently, for internal purposes, some companies amplified the industry plan by providing greater coding detail for the single premium for mandatory coverages. At the same time, these companies moved away from the indivisible premium approach by providing separate coding for certain of the optional coverages. Over the years this separate coding became onerous since it required the punching of additional premium detail cards on a significant and increasing proportion of Homeowners policies. Furthermore, it was found that all too often the additional information either was not available, was of very limited use or was of questionable accuracy so that little reliance could be placed upon it. When more than one premium classification appeared on package policy coding slips, it was apparently very difficult to obtain any material degree of accuracy in the application of the appropriate classification code to losses. In studying runs of the losses coded as falling under a given optional endorsement, discrepancies were found between the coded cause of loss and the coverage provided by the endorsement. These discrepancies simply pointed up the fact that any increase in detail requirements entailed a reduction in accuracy as well as an increase in processing cost. Thus, while the separate coding and punching of certain items on Homeowners policies required a considerable expenditure, there was not a commensurate return in usable or available information.

Commercial Packages: As a natural outgrowth of the highly saleable Homeowners program, the package principle was applied to classes of business outside the dwelling field. One of the first packages in the commercial field was the funeral directors policy and the introduction of this package on an independent basis preceded any action on the part of the bureaus. The premiums for this first commercial package were published in a manner similar to

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[1] Kenney, J. F., and Keeping, E. S., *Mathematics of Statistics*, 3rd Edition, Vol. 1, p. 1, D. Van Nostrand Co., Inc., 1954.

Homeowners, that is, a single premium for the basic property and liability coverages with additional premiums for various optional coverages. Accordingly, the first statistical plans drawn up for use on this package used the same approach which had been adopted in some quarters for internal purposes for Homeowners; that is, the basic premium was coded as a single premium while as many as five different optional coverages were coded separately. These first plans were relatively simple and were designed to produce experience for the total package with very little further information other than construction-protection and an exposure such as number of funerals or, in the case of motels, sleeping units.

As further progress was made into the commercial field, it was soon found that more detailed information seemed to be needed and also that publishing single premiums for the basic coverage was impractical (at least in the developmental stage). As a result, statistical plans similar to the example in Exhibit I have evolved. These commercial package statistical plans were aimed at breaking premiums and losses back to components—not just to property and liability but to building, contents, optional property coverages, standard liability, elevators, etc. At the time these plans were drafted, it was recognized by many that they would be expensive to administer since they could require the separate coding of dozens of items for a single policy. However, with high average premiums (five to ten times as large as Homeowners) and the value of the resulting information, it was felt that such an expense was justified.

The Statistical and Rating Problems: Several factors have combined to bring to a head various companies' problems with multiple peril package statistical plans. Particularly in the commercial package field there has been increasing concern with the cost of processing the business. The complexities involved in implementing the component statistical plans have been creating an extremely expensive mass of detail. Developments have been producing a split personality in that while premiums for most packages have in effect been developed from components on a readily divisible basis, packages have been introduced more recently for which a large portion of the premium was developed from a single rate not readily divisible into components. As a result of these factors, it became increasingly apparent that commercial package statistical plans needed to be reviewed with a view toward making them as simple and uniform as possible and more economical to apply.

As a complicating factor, pressure developed because the commercial package plans of some independent companies were drawn up prior to the development of the industry plans. Even though these plans involved considerable detail and were almost as expensive to administer, the independent plans were not necessarily exactly compatible with or readily convertible to the industry plan, thus making virtually impossible the compilation of meaningful data on an industry basis.

As a result of the foregoing, the authors commenced various separate reviews and investigations of the various facets of these multiple peril package

problems, statistical and rating. In discussing their separate studies, it became increasingly apparent to the authors that not only were the present statistical plans expensive to administer, but that much of the information the plans could produce was useless from a rating point of view. As a result, it was decided to commence with research and discussions on a joint basis. The goal was to find solutions first to the problem of how to rate the packages and second to the problem of what statistical plan or plans would best enable application of such a rating method. The results of these studies with respect to the commercial package phase of these problems were presented at a panel discussion by the authors at the May 1963 meeting of the Casualty Actuarial Society. This paper is an end product of the studies made and materials prepared for that panel presentation.

SELECTION OF THE RATING METHOD

As noted previously, premiums for package policies were developed originally by taking premiums for the separate coverages from the respective manuals. Such premiums were added together, and an overall discount was applied to the total. This method, which will be referred to as the traditional method, seemed to be the logical one with which to begin the study of rating methods.

The Traditional Method: The traditional method was perhaps the only method that could have been used in the rating of commercial package policies before any actual package experience became available. As a result, there seemed to be little justification for continuing the traditional method on a permanent basis unless it would provide the best ultimate basis for making rates. A review of the pros and cons of such a method, therefore, seemed advisable. The advantages can be summarized as follows:

1. The traditional method would afford a proper basis for determining an adequate loss cost level for the aggregate of all risks in each package.

2. The traditional method would provide a certain measure of safety and would be consistent with the past.

3. This method would provide a reliable means for preserving a flexible position in the future.

4. Because this method would combine the experience of package and non-package policies, many people have concluded that the greater volume of data would produce more credible experience. (This was listed as one of the advantages of the traditional method even though there is no general agreement on the conclusion that the figures would be more reliable.)

These were the advantages; the primary disadvantages were as follows:

1. The traditional method would not produce equitable loss costs by

type or class of insureds *within* one package policy program. Only the package code would make it possible to identify individual package experience. Thus, only one overall loss cost differential could be computed per package; and all risks in the package, regardless of type or combination of coverages taken, would therefore receive the same experience modification. This would, indeed, be inequitable and discriminatory—and would only lead to the establishment of more refined package forms which would in turn lead to thinner and thinner experience data in each grouping.

2. The traditional method would not encourage any change or standardization in coverages presently taken. This would result because the loss cost differential would be uniform for all risks within the package. Thus, there would be no incentive to add or change coverage; and the package program, therefore, would in essence do no more than continue the "a la carte" selection that existed in prepackage days. The only difference would be that one more refinement, the calculation of loss cost differentials by package policy form, would be incorporated in the rating calculation. Perhaps this refinement would redistribute the loss cost charges in a more equitable fashion between package and non-package risks, but the aggregate loss costs for the entire population of risks would not change. As a result, the "net" reduction in loss costs (lower package premiums not offset by higher non-package premium levels) anticipated in the original premium charges would indeed vanish; and in the end, the industry would be almost back where it started from, having lost a considerable amount of money in the interim.

3. The traditional method would require a feed-back of experience into the manual classifications for the various coverages involved, a procedure which would be tremendously complicated. It would, therefore, be necessary to keep different statistical detail for each coverage, and in some instances it would .be necessary to keep different statistical detail even for the same coverage. To illustrate: fire and E.C. coverages on the smaller funeral directors and motel risks are rated as dwellings; for larger risks, these coverages are rated on a mercantile basis.

4. Package loss costs developed by the traditional method would depend upon the loss costs inherent in the rates from the various manuals for each of the individual coverages. Thus, if any of these non-package rates were changed, the traditional rating method properly applied would require a corresponding change in the package rates with a subsequent review of the package loss cost differential. On this basis, the ratemaker would be forever reviewing package rate levels.

From the analysis above, it was evident that the ratemaking technique used in determining the original commercial package premiums left much to be de-

sired and would be inappropriate as an ultimate rating method for these policies. The logical conclusion, therefore, was to reject the traditional method and design something new.

A quote from Jean Monnet, father of the Common Market concept, was particularly pertinent at this point: "Material problems are not very hard to resolve. What counts is to make up our minds to see things in the perspective of building the future and not of preserving the past." "Preserving the past" was inherent by definition in the traditional method and, after a review of the disadvantages listed above, it was evident that these disadvantages were the result of the limitations and complications superimposed on the collection of data solely for the purpose of combining package and non-package experience. Thus it appeared that any new plan ought to be designed so that package policy loss costs could be developed on the basis of package policy experience only. In this way, package policy experience would not be limited, complicated, distorted or lost by being combined with non-package experience.

As a result of this conclusion, it became necessary to determine how package experience should be classified for rating purposes. In other words, how should the pie be cut? There were two possibilities:

1. Loss costs could be calculated for each component coverage within the package, which when added together would produce the package premium for each insured. This approach will be called the component method.

2. Loss costs could be calculated for the package as a whole for each type of insured. This approach will be called the indivisible premium method.

The "component" method would develop premiums for each coverage (fire, E.C., time element, comprehensive crime, basic liability, elevators, products, etc.) by type of insured, and the "indivisible premium" method would develop premiums by type of insured, according to the combination of coverages selected.

Indivisible Premium or Component Approach: At first blush, it might appear that there would be little difference between these two methods, but subsequent study showed that there was quite a difference — and that one approach was indeed superior to the other.

First of all, both methods would be equally adept at producing the proper loss cost for the entire package in the aggregate. This was true because both plans would identify loss experience for each package policy form and, therefore, total loss experience by package would be available under either method. It would also be possible in either method to develop pure premiums or to develop loss ratios at current premium levels for the experience period.

There were four areas, however, in which the two plans differed materially:

1. The first area had to do with the compliance of these plans with the philosophy of package policies. This philosophy encompasses the

principle that certain types of insureds provide a better basis for classification than does a classification system based upon the individual perils. Such a philosophy anticipates that a motel with a swimming pool will have a different type of customer and general maintenance than a motel without a swimming pool. This same rationale would apply to motels with restaurants and without, new versus old, etc. Likewise, it would be expected that a different type of insured would select different combinations of coverage. Thus, the package loss cost for a particular insured might not equal the sum of the loss costs for the coverages rated individually for all insureds. Homeowners furnished a good illustration of this concept. Suppose that Homeowners had been rated on a component basis as follows:

a. The basic policy was Homeowners A.
b. The B endorsement provided the additional coverage in the Homeowners B policy over the A policy.
c. The B+ endorsement provided the additional coverage in the Homeowners B+ policy over the B policy.
d. The C endorsement provided the additional coverage in the Homeowners C policy over the B+ policy.

The component method of rating would have established loss costs for a, b, c and d separately. (The method actually used, the indivisible premium approach, established loss costs for each of these plans.) However, had the component method been used, improper premium charges would have resulted because experience has shown that there were differences in the four plans not completely attributable to the differences in the endorsements involved. In other words, it is highly probable that the component method might not produce the most equitable rate by type of insured — a situation inconsistent with the underlying philosophy of package policies. It would be folly then to select a method which would move away from this particular package concept when it may very well have considerable potential merit. Just through general reasoning, this package concept makes sense because it incorporates the logic in the old saying, "Birds of a feather flock together." It could indeed be possible that risks, like birds, would combine into classes or flocks according to common interest and insurance needs, with such homogeneity being reflected in the loss experience. And if this homogeneity had no influence on the loss experience, which would indicate that this package principle did not exist in the commercial field, then the use of the indivisible premium rating method would be justified because it would succeed in making such evidence available. With the component method, such data would not be available and, therefore, the truth of this package principle would never be known or tested in the commercial package field.

2. The second difference between the two methods of rating was that the indivisible premium approach would encourage a reduction in the number of forms available; whereas the component method would not. With the indivisible premium method, statistics would be collected by combinations of coverage and, therefore, it would be possible to determine which combinations were the most popular, which combinations produced the lowest relative premium levels, and which combinations earned no advantage over non-package premiums and as a result should be discontinued. This knowledge would be most significant in keeping the commercial package policy field successful. Information of this kind could not be made available under the component rating approach.

3. The third area of difference was the difficulty that would occur in getting a proper rate for a particular coverage with the component method, even when no variation in the loss cost by type of insured existed. This would result because of the duplication in coverage. For instance, if glass were damaged by wind, the loss would be covered both under the E.C. coverage (in the basic physical damage coverage) and under the optional glass endorsement. Such a loss would be coded to E.C. if no glass endorsement were involved, and to the glass endorsement if one existed. Likewise, some products coverage is furnished under the basic coverage in a motel policy, covering such items as continental breakfasts and vending machines. However, if a products endorsement exists on the policy, any products loss would be charged to the products endorsement. As a result, when duplication in coverage exists between two of the component coverages, it would be difficult to get accurate loss cost measurements for the optional endorsements involved. This would become a further complication in the coding of losses because one cause of loss could be assigned to two different coverages, depending upon what endorsements exist on the policy.

4. The fourth area of difference was in the coding of experience data under both methods. With the indivisible premium approach, experience would be collected *by policy;* whereas experience would be collected *by coverage* under the component rating method. To code and collect experience by policy would be a much simpler operation than it would be by coverage. This would be so because a single statistical code could be used for each policy. This one code would identify the type of insured, the combination of coverages, and the exposure bases—the only limitation being the space available on the statistical record. This single statistical code would be the only statistical identification (except for cause of loss) that would be recorded on premium and loss transactions affecting that policy, and all transactions would therefore be identified by one and the

same statistical code. On a component basis, a different statistical code would be necessary for each coverage afforded under the policy — both as respects premium and loss transactions. To visualize the concept of the single statistical code per policy, the necessary statistical records are illustrated in the form of an 80 column punch card — one for premiums and one for losses — as shown in Exhibits III and IV. The cards were divided into the general areas of information recorded so that the statistical code, to which reference is being made, could be identified and shown in its proper perspective. The cards also set forth those codes which are common to all transactions affecting one particular policy. The statistical code is so designated. Thus from this elementary punch card illustration, one can easily visualize the concept of one statistical code (except for cause of loss) per policy. With only a moment's reflection, the advantages implicit in such a coding method are apparent. To name a few:

a. There would be only one statistical code per policy. All subsequent classification coding for both losses and endorsements could be copied. This would simplify the coding; and, as a result, the statistics would be more accurate. On a component basis, there would be as many statistical codes per policy as there were coverages contained therein. This would require several premium codes and a "choice" of codes when each loss occurred.

b. There would be only one statistical code (including cause of loss) per occurrence per claimant. This would have a tremendous advantage over the "component" rating method. An illustration should further clarify this point. With the single statistical code per policy, a fire loss would require only one code for all payments to one claimant; on a component basis, three possible codes might be necessary — one for the building loss, one for the contents, and one for time element.

c. With one statistical code, each loss would be identified by cause of loss and would be coded the same regardless of the endorsements on the policy. This would eliminate the complication discussed earlier where a loss could be coded two different ways depending upon the endorsements on the policy.

There were four areas in which the indivisible premium rating method and the component rating method differed materially. These areas are summarized below:

1. Compliance with the philosophy of package policies so as to achieve maximum equity.

2. Basis for screening and reducing the number of plans available so as to keep the package program both attractive and profitable.

3. Elimination of complications caused by duplication of coverage between endorsements and the basic policy.

4. Simplicity in the method of coding experience data for the double benefit of greater accuracy and lower expenses.

Because of these differences, it was believed that the indivisible premium rating method was indeed superior in theory to the component rating approach. The adoption of the indivisible premium rating method, therefore, depended upon its feasibility.

INDIVISIBLE PREMIUM STATISTICAL PLAN

As set forth in the previous section, the indivisible premium method of rating should be based upon experience collected *by policy* by means of a single statistical code; this concept is not new. This approach in one form or another had been used very successfully in both Accident and Sickness, and Marine, to mention only two. It was present in the National Board 1958 Homeowners Statistical Plan where there were separate single codes designated for Forms 1, 2, 3 and 5 — said forms differed from one another basically in the combinations of coverage afforded.

Further, the statistical plan for the Special Multi-Peril Policy endeavored to use the same statistical code on each component split where possible; this was an attempt to gather together information on the various identifiable classes of insureds and on the combinations of coverages selected by these insureds. Thus, there were divisions such as garden apartments, three family apartments, and four family apartments for identification of classes; and, for combinations of coverages there were divisions such as with or without elevators, named peril or all risk. These were attempts to use modified versions of the single statistical code.

A statistical plan using a single statistical code designed for one of the commercial package policies — motels — is shown in Exhibit II. A statistical plan supporting the component method, illustrated by the Special Multi-Peril Policy (SMP) Statistical Plan for motels, is shown in a simplified form in Exhibit I. The SMP Plan has been included not only for purposes of comparison but also because the model single statistical code plan was developed simply by building from the present SMP Plan. Thus, a review of the SMP Plan will expedite the analysis of the single statistical code plan.

SMP Statistical Plan: For motels, the SMP plan calls for all of the basic identifying information such as state, zone, term, transaction, year of loss, and catastrophe codes; the exhibit, though, has been limited to a description of only the statistical information.

The first two columns of the statistical field are to be used for major peril codes which would split the experience into categories to preserve the data along major bureau lines. The next three columns are to be used to identify the program and class and will be the same for all major peril codes; these

columns will distinguish between motels with and without swimming pools or restaurants, and those policies with only personal property insured and those which insure the building.

For the property peril, two additional columns are to be used; one column will code the standard fire classification of protection and construction, and the other column will identify three different types of deductible situations, the main emphasis being placed on the presence or absence of the windstorm deductible. The liability peril calls for the coding of limits in one column and the actual exposure must be recorded in ten columns. Comprehensive Crime Coverage Insuring Agreement; IA and IB — Fidelity calls for the coding of two digit classes provided. Cause of loss must be recorded in two columns for each of the seven perils called for.

It is obvious that only three columns would give information about the package as a whole; these are the program and class code columns. Almost no information would be available about the combinations of coverage selected by the various classes of insured. Instead of using the other required columns to gain information about the package, each of these remaining statistical columns was used to split the experience for purposes other than the evaluation of package experience or package classification.

A review of the model single statistical code plan, illustrated in Exhibit II, will show the modifications necessary to funnel the flow of information into combinations of coverage rather than into separate coverage categories.

Model Statistical Plan — Single Statistical Code: The model single statistical code plan in Exhibit II was built around the SMP split experience statistical plan; the sample plan is an indivisible premium plan and contemplates that there will be only one direct insurer on each risk.

Two columns would have to be used to identify the major peril (that is, the subline of insurance which would be the same for all commercial package policies) and two for the policy form or program (such as motels, apartments, etc.)—this is basic information. Then, additional columns would be used to identify the various classes of insured and the combinations of coverage selected by insureds. By judicious use of columns, the package experience could be obtained on the following classes of insured:

1. Motels with and without swimming pools and restaurants.
2. Motor Hotels (three or more stories) as opposed to conventional motel structures.
3. Ownership of the motel.
4. Age of the motel buildings.
5. Construction and protection including sprinklered risks.
6. Limit of Section II liability.
7. Size of policy (amount of insurance).

On the combinations of coverages selected, package experience would be available as follows:

1. Basic perils, broad perils, and all risk policies.
2. Policies with and without comprehensive crime.
3. Building only, contents only, and building and contents policies.
4. Policies with elevator liability and consequently insureds with elevators.
5. Various deductible combinations.

Of course, it would be necessary to have a cause of loss so that experience would be available by desired cause of loss.

With the single statistical code plan, experience could be pulled together for the package or for any combination of codes desired. Thus, it would be possible to accumulate overall package experience in any pre-determined manner.

One can easily see from the review of these two statistical plans that there would be an increase in the amount of available classification information per policy in the indivisible premium plan as compared to the component split plan; for example, the SMP Plan for motels has only eight items of classification and coverage combination experience available; the single statistical code plan has a considerably greater number of potential groupings for review and evaluation. This result, of course, was inherent in the design of the plan, and this preference for data by policy was made possible through the sacrifice of statistical detail by individual coverage.

INDIVISIBLE PREMIUM RATEMAKING PROCEDURES

The ratemaking procedures cannot be spelled out in detail under an indivisible premium approach because until the data becomes available the significance of the various combinations and refinements will not be known. However, the statistical plan was designed to furnish a flexible framework under which data could be compiled for ratemaking purposes. The scope of the ratemaking techniques contemplated will be set forth in this section.

Amount of Insurance—Exposure Base or Classification: As shown in Exhibit II and in the punch card illustration, the model single statistical code plan provides four digits for exposure, thus making it possible to develop rates on a pure premium basis. The exposure base designated in Exhibit II is "amount of insurance." Other exposure bases would be useful, such as floor area, number of elevators, number of pony rides and so on, but the space available on the statistical records is limited. Insured value is a more universally applicable exposure basis than any other for commercial package policies, and it is also the most important rating basis since about two-thirds of the package was originally rated on the basis of insured value. Moreover, insured value is correlated with many of the other exposure bases. For example, the value of a building is closely correlated with the

number of square feet of floor area, especially when the buildings are classified by type of construction and by occupancy.

The use of "amount of insurance" as exposure implies that rates per thousand dollars of protection would be established for the various combinations of coverage by statistical classification. Although subsequent experience may indicate that pure premiums per thousand dollars of protection have little application in the development of equitable rates in the commercial package field, the model statistical plan was designed so that such conclusions would be possible. There is no question that some use of pure premiums per thousand dollars of insurance will be made for some causes of loss by statistical classification.

The extent to which amount of insurance would be used as an exposure base, however, was not a matter of serious consequence in the early stages of the development of a ratemaking procedure because this information would be needed as a size of risk classification to the extent that it would not succeed as an exposure base. The significant point here is that it was necessary to include amount of insurance in the model statistical plan to provide for either use in the ultimate development of rates.

If amount of insurance were to be used as an exposure base, such statistical coding would be necessary only on the premium record. If, however, amount of insurance were to be used as a part of the statistical classification, it would be necessary to record it on both the premium and loss records. This was provided for in the model statistical plan outlined.

If future experience proved that thousand dollars of insurance had no merit as an exposure base in commercial package ratemaking, such statistical detail would be used for classification purposes only. Then the sole exposure base in the model statistical plan outlined would be number of policy years. Number of earned policy-years would be approximated from a compilation of the number of policies-in-force. Such a count would be obtained from the transaction field in the management and accounting (premiums only) portion of the statistical record illustrated by punch card in a previous section. Such a method of deriving earned policy-years has been assumed in this paper; however, number of earned policy-years could be obtained by direct recording which would require an additional two-digit field in the premium record similar to the handling of cause of loss in the loss records. On this basis number of policy-years would be recorded in tenths similar to the use of car-years in automobile insurance; then pure premiums would be developed per policy-year in any classification detail desired including size of risk.

It would, of course, be possible to use amount of insurance both as a classification and as an exposure base. This dual role would be possible if the experience data were collected by size groupings and then reduced to pure premiums per thousand dollars of insurance on building and contents within each size grouping.

If amount of insurance was used as a classification, it would then be pos-

sible to evaluate the experience by size of policy. It has already been shown in other areas that experience is different for small policies as compared to large policies. Unit reports have been used in Workmen's Compensation to bring together all the premiums and losses for each risk and to obtain the experience by size of risk. Homeowners was one of the few other areas where experience was easily obtained by size of risk and that was because the amount of insurance was coded on both premiums and losses. Many valuable benefits have been derived from the ability to study Homeowners experience by size of risk. Commercial packages should also greatly benefit from the adoption of the same procedure which proved so useful in Homeowners.

In addition, the use of amount of insurance as a classification would make it possible to introduce improved rating-by-layer techniques for property perils. Amount of insurance would indicate the size of the largest potential property loss. Ratemaking with limited volumes of data would then be made a great deal easier if the data were in a form suitable for making rates by layer of insurance. If a certain class had experience premium of $1,000,000 and the largest potential property loss in that class was $1,000,000, the experience losses would not be fully credible. Either the experience included a loss of $1,000,000 or it did not, and in either case the experience would not be representative. In liability insurance unlimited losses have not been used to make rates because there has not been sufficient volume to absorb the fluctuations caused by very large losses. The same principles would apply to property insurance. Depending on the volume of data available and the size of risk group being studied, it might be decided to limit each loss to $10,000 or perhaps to $25,000 in order to eliminate the shock losses and to increase the reliability of the indications. If the losses were limited, it would also be necessary to limit the premium so that basic losses could be compared with basic premiums. The amount of insurance would be vital in making this kind of evaluation of property losses. This technique would also be useful in the rating of deductibles, excesses and coinsurance.

The discussion so far has been limited to the use of amount of insurance as an exposure base or as a classification. Now to the ratemaking procedures for commercial package policies. If exposure were recorded as recommended, pure premiums could be obtained. Thus, both pure premiums and loss ratios would be available for making rates.

The Pure Premium Method of Ratemaking: The pure premium approach will be discussed first. For a given package, such as the motel package, an overall average pure premium could be obtained for the entire package. Then the experience for the entire package could be subdivided according to the class of insured and the combinations of coverages selected by each insured. For example, using the model statistical plan shown in Exhibit II, the motel package experience could be subdivided according to policy type (item 5)— basic perils, broad perils, or all risk. Pure premiums could be developed for

each of these subdivisions and relativities or relationships established among them. Then the same experience could be re-subdivided according to ownership (item 6); and separate pure premiums could be obtained for owner occupied, absentee owners, and tenants, thus making it possible to establish relationships or relativities among these subdivisions. This could be done for amount of insurance, construction-protection, deductible, age, whether there was a swimming pool, and so on, through all the categories coded by the statistical plan. Depending on the volume of data available, the data could be subdivided two or three ways at the same time. For example, the data for the motel package could be subdivided according to basic perils, broad perils, and all risk; and, at the same time, according to whether the policy were owner occupied, absentee owner, or tenant. Pure premiums and relativities would be established for each combination. This same data could be further subdivided according to, for example, whether or not the policy included a restaurant. In this manner, pure premiums and relationships could be established among the various classes of insureds and combinations of coverage in the motel policies.

This whole procedure of establishing pure premiums and relativities among the various classes would be similar to the procedure used in automobile insurance where relativities have been established among the classes of driver, merit rating groups, territories, and so on. These relativities have been established in automobile liability insurance on a pure premium basis (per car year) or on a modified form of the pure premium basis, using premiums obtained by extending the exposures at present manual rates. All these sets of relativities have then been meshed together to produce the actual rates. A similar procedure could be used for commercial package policies.

In all of this, judgment limitations would be used as is inevitable in rate-making. For risks which were the same in every other aspect, a higher rate would presumably always be charged for frame risks than for brick risks. And similarly more would be charged for broad perils than for basic perils. Other judgment limitations would be applied in the relationship of the package premiums to the non-package premiums. In this manner an average pure premium could be established for each subdivision of the motel policy that was coded.

Using the cause of loss coding, it would be possible to analyze the experience on a pure premium basis for separate perils or groups of perils. In this way the pure premium for certain perils in the motel policy could be compared with a pure premium for the same perils in some other policy, such as a fire pure premium or a wind pure premium or a liability pure premium. If two or more packages were expected to have the same pure premium or similar pure premiums for given perils, the experience from these packages would be combined in order that a more credible pure premium cost for selected perils or groups of perils could be established. The cause of loss codes could also be used to pinpoint the source of unusual fluctuations in the losses, such as a hurricane might create.

In commercial package policies, there will always be rate variations which will not be coded either because an insufficient volume of data would be involved or because of the practical limitations of the statistical records. This situation has existed in many lines of insurance where certain rate variations, such as the non-standard floor opening in fire insurance, have never been coded. Only the most important rate variations would be coded, subject to the limitations of the statistical records. For those variations which would not be coded, a schedule of modifications would be established which would apply to a basis rate. The basis rate would be the pure premium established for each class. The schedule of modifications would consist of credits and debits which would apply to the basis rate. Such modifications would be based on judgment and would reflect all pertinent knowledge and information available, including the charges or credits for such features in existing rating schedules. This would be the same technique used originally to make rates for some of the coverages included in the commercial package policies.

The Loss Ratio Method of Making Rates: Now, the loss ratio method can be reviewed. The overall loss ratio would make it possible to calculate an indicated rate level change which would provide an excellent check on the analysis on a pure premium basis. It also could be used independently of any pure premiums to revise rates, similar to the way the loss ratio method is used today in fire insurance. The rate level change indicated by the loss ratio could be distributed by class of insureds and combination of coverages either on a formula basis using credibility weights or by some other reasonable method, just as an overall rate level change for O.L.&T. insurance would be distributed by group of classes, class, and territory. An overall check on a loss ratio basis is important in any line of business where schedule modifications are used. Such a check is extremely important in the commercial package field because of the recent adoption of the casualty type of experience and schedule modification in addition to the type of modification contemplated by the traditional fire rating schedules. Under such conditions it would be essential either to use a rating method which would reflect the experience on modifications actually used or a method which would provide a satisfactory check. Loss ratios based upon collected premiums would fulfill this essential requirement.

The ratemaking procedures discussed have been confined to the loss portion of the premium dollar only. It is in this area that decisions have to be made prior to the actual recording of the data, if the experience data is to be the servant of the ratemaker. The expense loading is certainly a significant portion of the total premium; but except for the reflection of efficiency in the processing of statistics, the determination of the expense loading is independent of the rating method selected. Therefore, this omission will not jeopardize any of the conclusions made in this paper concerning the measurement of the loss portion of the premium dollar.

CONCLUSION

In concluding this paper, it is pertinent to recall a comment made by Clarence Kulp, one of the stalwarts of this society. With reference to insurance rates, he said:

> "The rate has essentially only two functions. It should produce total funds sufficient to cover the insurer's obligation; it should distribute the cost of insurance fairly among insured persons." [2]

The authors believe that the thinking expressed in this paper ties in with Dr. Kulp's views. Included in this study are considerations of many facets of the problem, among which are the complications of integrating package and non-package experience, the importance of charging the single insured covered by the package the correct, adequate and not excessive total premium, and the need for maximum simplicity both for reasons of accuracy and expense.

From all of this, the authors concluded that the indivisible premium approach would not only be a theoretically correct method of rating but that it would also work in actual application. In addition, this approach would enable the compilation of meaningful statistics with greater ease, at less cost and with greater accuracy. Therefore, the individual premium approach appeared to be by far the best method to use in rating commercial package policies.

[2] Kulp. C. A., "The Ratemaking Process in Property and Casualty Insurance—Goals. Technics, and Limits", *Law and Contemporary Problems*, Autumn, 1950, Vol. 15, No. 4, pp. 493, 521, The Duke University School of Law.

EXHIBIT I

STATISTICAL PLAN FOR SPECIAL MULTI-PERIL POLICY—
MOTEL PROGRAM
(Component or Divisible Premium Plan)

Code

1. . . . .

2. . . . .

3. Major Peril Code (2 columns) (Sub-line of insurance)
   a. Property Coverage (Section I)   90
   b. Liability Coverage (Section II)   91
   c. Comp. Crime Cov. Ins. Agreement II, III & IV—Burglary   92
   d.   "   "   "   "   "   IA and IB—Fidelity   93
   e.   "   "   "   "   "   V—Forgery   94
   f. Open Stock Burglary and Theft Coverages (when separate rate
   or premium charge)   95
   g. Boiler and Machinery   96

4. Program and Class Code (3 columns)
   Motel (Exposure: Number of Rental Units)
   a. Motel—with swimming pool and restaurant
       (1) Building only, or Building and Personal Property   101
       (2) Personal Property Only   102
   b. Motel—with swimming pool
       (1) Building only, or Building and Personal Property   103
       (2) Personal Property Only   104
   c. Motel—with restaurant
       (1) Building only, or Building and Personal Property   105
       (2) Personal Property only   106
   d. Motel—all other
       (1) Building only, or Building and Personal Property   107
       (2) Personal Property Only   108

5. . . . .

6. Construction and Protection Code—Major Peril 90 only (1 column)

7. Deductible Code—Major Peril 90 only (1 column)
   a. No deductible   1
   b. Wind deductible only   2
   c. Wind deductible and other deductible   3

8. Limits Code—Major Peril 91 only (1 column)
   a. $ 25,000   1
   b.   50,000   2
   c.   100,000   3
   d.   200,000   4
   e.   300,000   5
   f.   500,000   6
   g. 1,000,000   7
   h. Over 1,000,000   8
   i. All Other   9

Exhibit I (Continued)

Code

9. Exposure—Major Peril 91 only (10 columns)
   For motels, report number of rental units

10. Type of Loss Code (2 columns)

11. . . . .

12. . . . .

13. . . . .

(Besides the above, Major Peril 93 must be broken down into numerous business classifications)

NOTE:

Items are numbered in accordance with the published industry SMP statistical plan. Blank items are codes in the management-accounting field.

EXHIBIT II

PROPOSED MODEL STATISTICAL PLAN FOR SPECIAL MULTI-PERIL POLICY—MOTEL PROGRAM

(Indivisible Premium Plan)

(Direct insurance is 100% with one Company)

				Code	Accumulated Number of Columns
1.	. . . .				
2.	. . . .				
3.	Major Peril (Sub-line of insurance)			90	2
4.	Policy Form				
	a. Motels			01	4
5.	Policy Type				

5. a. First Column

	Swim-ming Pool	Three or more Stories	Restau-rant	Code	
	No	No	No	1	
	"	"	Yes	2	
	"	Yes	No	3	
	"	"	Yes	4	
	Yes	No	No	5	
	"	"	Yes	6	
	"	Yes	No	7	
	"	"	Yes	8	5

b. Second Column   *Comprehensive Crime*

		Code	
Basic Perils Policy			
	No	1	
	Yes	2	
Broad Perils Policy			
	No	3	
	Yes	4	
All Risk Policy			
	No	5	
	Yes	6	6

Exhibit II (Continued)

		Code	*Accumulated Number of Columns*

6. Ownership

	Passenger Elevator or Escalator Liability	*Code*	*Accumulated Number of Columns*
Owner Occupied	No	1	
(Bldg. & Cts. Insured)	Yes	2	
Absentee Owner	No	3	
(Bldg. only Insured)	Yes	4	
Absentee Owner	No	5	
(Bldg. & Cts. Insured)	Yes	·6	
Tenant	No	7	
(Contents Only Insured)	Yes	8	7

7. . . . .

8. Construction Protection

	Code	Acc.
a. Frame Protected	1	
b. Frame Unprotected	2	
c. Brick Protected	3	
d. Brick Unprotected	4	
e. Fire Resistive Protected	5	
f. Fire Resistive Unprotected	6	
g. Frame Sprinklered	7	
h. Brick Sprinklered	8	
i. Fire Resistive Sprinklered	9	8

9. Deductible Code

a. All Perils Deductibles

	Code	Acc.
(1) $100	1	
(2) $500	2	
(3) Other	3	

b. Named Peril Deductibles

	Code	Acc.
(1) Full Coverage Wind with no deductible on Broad Perils	4	
(2) Full Coverage Wind with deductible on Broad Perils	5	
(3) Windstorm Deductible with no deductible on Broad Perils	6	
(4) Windstorm Deductible with deductible on Broad Perils	7	

	Code	Acc.
c. All other deductibles	8	9

Exhibit II (Continued)

	Code	Accumulated Number of Columns
10. Age of building		
a. New (0-14 years)	1	
b. Medium (15-39 years)	2	
c. Old (40 and over)	3	10
11. Basic Section II Liability		
a. $ 25,000	1	
b. 50,000	2	
c. 100,000	3	
d. 200,000	4	
e. 300,000	5	
f. 500,000	6	
g. 1,000,000	7	
h. Over 1,000,000	8	
i. All Other	9	11
12. Amount of insurance		
Enter actual number of thousands of insurance on Building and Contents; if total is in excess of $9,999,000, enter 9999	xxxx	15
13. Type of Loss		
Fire, Lightning and removal	10	
Windstorm and Hail	11	
Explosion; riot and civil commotion; vandalism and malicious mischief; aircraft and vehicles; smoke	12	
Water Damage including sprinkler leakage	13	
Theft including burglary, robbery, mysterious disappearance (if presumed to be theft)	14	
"Employee dishonesty" and "depositors forgery"	15	
All other Property Perils	16	
Liability	17	
Medical Payments	18	

NOTE:

Items are numbered so as to be compatible with the SMP Component or Divisible Premium Plan insofar as possible.

EXHIBIT III

PREMIUM CARD					
MANAGEMENT - ACCOUNTING CODES		STATISTICAL CODE BOTH PREM & LOSSES		DOLLARS OF PREMIUM
BOTH PREMIUMS AND LOSSES	PREMIUMS ONLY	CLASS	EXPOS.	

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00000000000000000000000000000 0000000000000000000000000000000 0000000000000 0000 0000000
 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 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
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99999999999999999999999999999 9999999999999999999999999999999 9999999999999 9999 9999999
 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 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
IBM 5081
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COMMERCIAL PACKAGE POLICIES

EXHIBIT IV

LOSS CARD