

THE DISTRIBUTION OF CASUALTY ADMINISTRATION  
EXPENSE BY LINE OF INSURANCE

BY

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In his commendable paper, "The Theory of The Distribution of Expenses of Casualty Insurance" (P.C.A.S., Vol. XVII, page 22) Mr. F. S. Perryman in referring to general administration expenses stated, "It is of course precisely this group (administration expenses including audit) on which, up to the present, least work has been done with regard to equitable distribution." While considerable may have been accomplished in the matter of distribution of general administration expense since that time (1930), the results are not to our knowledge contained in any generally accessible record. It is the modest hope of the writers of this paper that they may contribute some ideas on the practical aspects of distribution of this general classification of expense. We believe from an analysis of the combined New York Casualty Experience Exhibits that too little importance has been attached to the problem of equitable distribution by line of insurance for this classification, and that there has been a general feeling that administration expense is more or less directly a function of premiums and, consequently, refined methods of distribution are unnecessary or not worth the effort or expense involved. A cursory study of the Annual Statement or the New York Casualty Experience Exhibit will readily show that this classification accounts for the greatest proportion of expense not directly allocatable. It usually exceeds acquisition (other than commissions) and claim expense (other than allocated claim expense).

While it is our purpose to deal primarily with the practical aspects of the distribution of general administration (excluding payroll audit\*) expense to line of insurance, any practical system of distribution must be based upon sound theory and it will be necessary to thoroughly consider the theoretical aspects. Mr. Perryman has so well covered the theory of expense distribution that little of importance can be added. Most of what we shall

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\* The 1937 Convention Annual Statement Blank makes specific provision for payroll audit expense, Item 36, Page 3.

include on this aspect of the subject is taken from his paper and we freely acknowledge our indebtedness to him.

Expenses are classified both by nature (kind) and purpose. Under nature we have such items as: salary, rent, travel, furniture and fixtures, printing and stationery, etc. Under purpose we have such divisions as: acquisition, claim, inspection, payroll audit, and the rather inclusive purpose with which we are specifically dealing—general administration. Since this last item is rather general and inclusive, it is desirable to provide for its subdivision into its functional or departmental elements. Among those departments which may be termed major operating departments are :

Underwriting	Accounting (General and Premium)
Agency (Home Office)	Actuarial and Statistical

There are also such internal service departments as personnel, building supervision and maintenance, purchasing and supply, executive, legal (excluding claim), etc. In addition, we have certain expenses which cannot be classified as functional or departmental, but are more or less general or miscellaneous, but which are a part of general administration. These consist of certain portions of such expense as advertising, printing and stationery, furniture and fixtures, postage, telegraph, telephone and insurance.

Even further subdivisions of departments might be made if desired, but in general all departments can be roughly classified as major operating or internal service and for practical purposes of expense distribution no further subdivisions are necessary.

An effective distribution of expense to line depends primarily upon the recording of basic and essential accounting data in sufficient detail to enable the ready application of methods and formulae to such data. The equitable distribution of such expense depends upon the reasonableness and soundness of the methods and formulae adopted.

It is a fundamental of expense distribution that all items of expense which can be charged to a specific line (or combinations of lines) should be so charged and that only the residue of items should be subject to formula distribution.

The ideal accounting set-up to facilitate the recording of basic data for distribution of expense by line consists of maintaining subsidiary ledger accounts (generally termed sub-ledger accounts)

by department, by kind of expense, divided so far as practicable between allocated (assigned to a specific line) or unallocated. In setting up such a system, reasonableness should govern as between the theoretical and practical. Further, the cost of operating the system is of prime importance.

A large part of the expense for printing policies and other forms can be directly allocated to specific lines and where this is possible it seems worth while to do so. It does not, however, seem advisable to attempt to allocate any part of traveling expense, advertising, postage, telephone and telegraph directly to specific lines, although it is theoretically possible to do so. The individual items are small and, consequently, direct allocation is expensive. Further, the proportion of total expense represented by such items is so small that the additional refinement would have no appreciable effect upon the over-all results.

No more definite rules for the setting up of the basic machinery for distribution of expense by line are offered. The problem is more or less one for the individual company and depends upon the general internal operation of the company, and the extent and scope of departmentalization. In the case of our companies all sub-ledger account work is handled by about six clerks, which, considering the volume of expense involved, appears to be a reasonable cost.

Assuming an accounting set-up similar to that which has been indicated and which may be further assumed to meet the test of economy and efficiency, the problem then becomes one of the application of such methods and formulae as will produce an equitable distribution of the unallocated expense to line.

To avoid possible confusion in the following discussion of methods and formulae for expense distribution, it should be pointed out that unless otherwise qualified the term "expense" as hereafter used means that portion of expense which is not allocated directly to specific lines in the sub-ledger accounts.

As a rule each department will present a more or less distinct problem depending upon the size of the department, the extent of its functions and the kind or type of operations performed. In general some portion of the unallocated expense can be assigned to a single line. The proportion varies by department. In some departments such proportion is small. In others the entire expense

or a substantial amount may be directly assigned. In a large company underwriting may be divided into several departments or divisions, such as Compensation and Liability, Fidelity and Surety, Automobile, Burglary, Plate Glass, etc. The single line, Burglary, Plate Glass, etc. expenses are assignable directly to line. Where more than one line is involved, partial direct assignment is possible and the problem narrows down to one of distribution between two or more lines, such as Compensation and Liability (personal injury and property damage), Accident and Health, Fidelity and Surety and the various Automobile coverages or lines.

Our distribution of a particular department's unallocated expense is accomplished by one or a combination of the following methods:

1. Direct assignment to a single line
2. Direct assignment to two or more lines
3. Time study methods and judgment assignment
4. Formulae
  - (a) Number of items (policies, premium items, checks or drafts, punch cards, etc.)
  - (b) Amount of premiums (written or paid)
  - (c) Amount of paid losses

Since as a general rule salary cost is the predominant element of department expense and most other items such as traveling expense, rents, etc. are closely correlated to salary, we believe that unallocated department expense other than salary should be distributed to line in the same proportions as salary and have consistently followed this theory. In other words, salary is our basic element of department expense and the methods and formulae stated are applied to the distribution of salary. In some instances salaries are distributed on the basis of individuals, in others in groups or in toto.

At this point it may be appropriate to state that it is our belief after considerable experimentation and test that the allocation of rent according to salary produces reasonably accurate charges. We believe, however, that other bases, such as the average cost of space occupied or number of employees, will also produce reasonable and satisfactory results.

In the following portion of this paper we present methods and formulae followed as respects some major operating and internal service departments common to most casualty companies. The

departments used for illustrative purposes are: Casualty Actuarial, Casualty Premium Accounting, Compensation and Liability Underwriting, and Tabulating. These will be considered in order.

The departments have been selected mainly with the purpose in mind of illustrating the application of the direct assignment and time study methods and the use of the number of items formulae heretofore mentioned, although all methods and formulae are involved.

It should be pointed out that our "year" for purposes of expense distribution is a fiscal year ending October 31. This is necessary in our organization, since the distribution of expense in many departments involves from two to five companies. The distribution factors or percentages are determined as of the year ending October 31 and applied to the expenses for the calendar year ending December 31.

#### *Casualty Actuarial Department*

This department performs a variety of functions ranging from simple statistical compilations to maintenance of loss reserve records and general actuarial work. A careful analysis of expense is made yearly under the direction of the Statistician. The methods followed are those heretofore mentioned—direct assignment to a single line, direct assignment to two or more lines, assignment to two or more lines based upon judgment, and the application of various formulae to divide to line expense not partially assigned by one of the immediately foregoing processes, or to divide expense assigned to one or more lines to the various individual lines.

The department is a comparatively large one, consisting of approximately 240 employees. The department is divided roughly into five divisions and two of the larger divisions are divided into several units. This division and unit set-up obviously assists in the handling of distribution of expenses by line. For example, one division consisting of approximately 50 clerks deals almost exclusively with Compensation classification experience and consequently nearly 100% of the salary cost of the unit is assigned to the Compensation line.

In the process of distribution of expenses to line each individual salary is considered separately and either assigned directly to a line or group of lines, individually split to line on a judgment basis

or, where subject to formula, grouped with the salaries of other clerks whose work is similar and subject to the application of a particular formula.

Each division and unit presents its peculiar problems and for this reason the functions or work of each division will be described briefly and the basis of distribution given, with such explanations and comments as appear necessary. There are also included percentages of total cost distributed according to the various methods and formulae to indicate the relative importance of each.

*Division A*—Actuarial—general actuarial and secretarial. Actuarial work devoted mostly to the Compensation, Automobile Liability and Other Liability lines.

Bases of distribution :

- (1) Direct assignment to specific lines, 14.6% of total salary cost
- (2) Assignment to two or three lines on basis of judgment, 67.5% of total salary cost
- (3) Written Premiums, 17.9% of total salary cost  
(This last group represents mainly secretarial and stenographic services and special annual statement statistics)

*Division B*—Compensation experience exposure old Plan Schedule "Z"; Liability and Property Damage other than Auto experience, exposure and losses.

Bases of distribution :

- (1) Direct assignment to specific lines, 7.9% of total salary cost
- (2) Direct assignment to two specific lines (Other Liability and Property Damage), 71.7% of total salary cost
- (3) Assignment to three lines on basis of judgment, 20.4% of total salary cost
- (4) (a) Written premiums (That part of (2) and (3) assigned to Liability and Property Damage exposure)  
(b) Paid losses (The salaries of 3 clerks included in (2) above engaged exclusively on the loss feature of Liability and Property Damage experience)

*Division C*—Compensation experience; new form Schedule "Z", exposure and losses; old form Schedule "Z", losses and reports.

Bases of distribution :

- (1) Direct assignment to the Compensation line, 89.5% of total salary cost

- (2) Assignment to three lines of business on basis of judgment, 10.5% of total salary cost. (Consists mostly of salary of two clerks who assign classification codes to losses. On basis of estimate 90% of salary is assigned to Compensation and 10% to Other Liability and Property Damage)
- (3) Paid Losses (The Liability and Property Damage included in (2) above)

*Division D*—Statistical. Annual statement, branch, state and various calendar and policy year premium and loss statistics; suit record; loss reserve records; punching of paid loss and incurred loss cards, including compilation of annual and monthly statement loss reserves.

The division is divided into a number of separate units, ranging in size from 5 to 19 clerks.

Basis of distribution:

There is no direct assignment to a specific line, and except for assignment of an inconsequential amount to two or three lines on a modified judgment basis, the entire salary cost is assigned to line on a formula basis. The formulae are many and varied, depending upon the nature of the work performed. Examples of the formulae used for the more important operations are:

**Statistics.** Formula based upon the proportions of time spent on particular records. The records maintained are mostly single line records and the clerks generally work upon certain records. Consequently, it is comparatively simple to obtain a record of the approximate number of days worked each month on a particular record by the individual clerk and to distribute the salary accordingly.

In case of one extensive record involving all lines and requiring full time services of two clerks, the allocation is made on the basis of the actual number of entries by line.

**Suit Record**—number of suits by line.

**Loss Reserves**—number of items handled by line (in some instances this will be claim files, in others number of claim drafts and in still others a combination of the two, according to the kind of operation performed by the particular individual clerk).

**Punching paid and incurred losses**—number of cards punched by line (The formula for each individual clerk takes into consideration the number of lines worked on).

**Compilation of loss reserves, Supervision and Miscellaneous**—Salaries are distributed to line on the basis of the distribution of the salaries of all specific units combined.

It will be noted that no part of the expense of this division is distributed on a premium basis.

*Division E*—Miscellaneous experience. Exposure and loss experience, Automobile (all coverages, including Fire, Theft and Comprehensive), Burglary, Plate Glass, Boiler and Machinery. This division is also divided into units representing the various lines of business involved. In addition the Automobile unit is further divided to sub-units, such as coding, punching, changes and compiling final experience.

Bases of Distribution:

- (1) Direct assignment to specific lines (Burglary and Plate Glass), 10.3% of total salary cost
- (2) Direct assignment to two or more lines (Automobile Liability, Property Damage and Collision and Glass), 6.0% of total salary cost
- (3) Direct assignment to all Automobile lines (including Fire, Theft and Comprehensive), 48.7% of total salary cost
- (4) Assignment to two lines on basis of judgment, 13.9% of total salary cost
- (5) Assignment to three lines on basis of judgment, 8.0% of total salary cost
- (6) Number of risks. All of (2) above and a part of (4) above
- (7) Special formula. All of (3) above

A special formula is considered desirable for dividing the automobile expense to line, since the problem involves two separate but more or less related elements; first, allocation of expense by company, because of the fire company coverages and secondly, the division to line within each company. The allocation between companies is based upon the number of risks involving the major policy coverages, bodily injury liability for casualty and fire (including comprehensive) for the fire company. The division by line within each company is based upon the number of risks (coverages) written in each company. Supervision and certain general salaries amount to 13.1% of total salary cost and this portion is distributed to line on the basis of the distribution of the salaries of all specific units combined.

The following exhibit shows the percentage distributions of salaries by division and for all divisions combined, on the basis



of direct assignment, judgment assignment and other methods and formulae:

Division	Direct Assignment to			Judgment Assignment to		Other-wise Assigned	Total
	A Single Line	Two Lines	More than Two Lines	Two Lines	More than Two Lines		
A	14.6	..	..	20.7	46.8	17.9	100.0
B	7.9	71.7	..	..	20.4	..	100.0
C	89.5	..	..	..	10.5	..	100.0
D	..	..	..	..	..	100.0	100.0
E	10.3	6.0	48.7*	13.9	8.0	13.1	100.0
All	24.0	10.7	15.2	6.6	12.3	31.2	100.0

\* Automobile (All Lines)

It will be noted that 24.0% of total salary cost is assigned directly to a single line of business and that 76.0% is subject to some kind of formula. Of the 31.2% not subject to direct assignment or judgment assignment, 8.6% represents supervisory and general salaries distributed in proportion to salaries of each individual unit excluding such salaries.

*Casualty Accounting Department*

The main function of this department is the recording and collection of premium items for all casualty lines, including all automobile coverages but excluding Accident and Health. The department also punches the cards from which are compiled all annual statement, state and agency, unearned premium reserve and all other written premium records other than classified experience records. The department also maintains a record of written, paid and outstanding premiums by branch office and direct reporting agency. This record is kept on bookkeeping machines.

The department is a large one, consisting of approximately 200 employees, and is divided into a number of divisions and units, each performing more or less distinct functions. There is no direct assignment of salaries to specific individual lines of business and various formulae are employed. The following are the more important divisions and units and the formulae used for distribution of salary to line:

Sorting and filing of new and renewal collection cards—

    Number of risks written by line

Punch operators—

    Number of cards punched by line

Recording and collection detail (entering endorsements, not takens, cancelations, payroll audits on collection cards subsequent to issue and posting paid premiums)—

    A composite table of percentages based upon the number of gross risks written, the number of net risks (less not takens) written and the number of paid premium items by line

Collections (general collection matters, handling correspondence, etc., with branch offices and general agencies on collection problems and procedure)—

    Amount of outstanding premiums by line

Audit of commissions—

    Number of paid premium items by line

Premium in course of collection control—

    A composite table of percentages, the averages of number of written and paid premium items by line

Supervision and general—

    Follows distribution of salaries of all specific units combined.

### *Casualty Underwriting Department*

This department is divided into two major divisions, (1) Underwriting, and (2) Policy Writing, and separate methods of expense distribution are followed for each division.

The underwriting division performs the usual underwriting functions including the maintenance of individual risk experience for the Compensation and Other Liability (including Property Damage) lines. Expense distribution is based upon the results of a time study. In this time study each clerk, regardless of type of work, kept a daily record of the amount of time spent on the respective lines involved for a considerable period of time. The aggregate number of hours thus assigned to each line provides the basis for a percentage distribution of salary to the respective lines. The percentages for the respective lines are adjustable to reflect the change in distribution between lines on the basis of the number of policies issued and the amount of premiums written

for each line during the year in which the time study was made and the particular year for which the distribution is being applied. The distribution to Liability and Property Damage is made on the basis of written premiums.

The policy writing division prepares all renewal policies, certificates, endorsements and such new policies (including endorsements) as are written at the Home Office for all casualty (excluding Accident and Health), and Automobile Fire, Theft and Comprehensive lines. In all cases a master application is typed, from which the policy or certificate is prepared by the "ditto" process. For some lines, mainly Automobile, this master application is used for the preparation by the same process of all departmental service cards. For Compensation, Other Liability and certain other lines, an additional master card is prepared from which the various departmental service cards are drawn off by the "ditto" process. The work of the division consists of typing, checking, pasting of endorsements, numbering, filing, etc.; also, the operation of a policy index file. The distribution of salary expense of this division is also based upon a time study. A time record for all operations involved was made involving from 150 to 300 policies, certificates and master cards in each of the following general classifications: Compensation, Other Liability, Automobile and All Other (Burglary, Plate Glass, Boiler and Machinery) casualty lines. From this time study, the average time required per item in connection with policies, certificates and endorsements and master cards was computed for each of the general classifications. A yearly record is maintained of the number of such items by kind for each classification. The number of items of each kind multiplied by the time required per item produces the total time costs for each classification and from these the percentage distributions for application to total salary cost are computed. This method, of course, gives weight not only to the number of items, but to the variation in time required to handle a particular kind of item under a particular classification.

The distributions to line within the general classifications involving more than one line are made on the following bases:

Other Liability and Property Damage—Gross written premiums  
Automobile Casualty—Gross written premiums  
Other Casualty Lines—Number of gross written policies

### *Tabulating Department*

This is a central department where all sorting and tabulating work is handled for all companies and departments. In addition, the department punches a considerable volume of cards.

The work of the department is divided into the following groups or divisions:

Sorting  
 Tabulating  
 Punching  
 Comptometer  
 Supervision and Service

#### Basis of Distribution :

A productive time record is kept of all sorting, tabulating and punching "jobs." This record is kept upon punch cards. The record carries the amount of time required for the job, the number of cards included and the line or lines of business involved. These productive time cards are filed away and tabulated at the end of the year by type of job. Job time involving a single line is assigned directly to that line, that involving more than one line is divided to lines on the basis of the number of cards involved in the job. From the total productive time distributed to line percentages are determined to be applied to the department expense to obtain the division by line. This method in effect gives weight not only to the number of cards punched, sorted and tabulated, but to the relative time required to punch the cards and the number of times the cards go through the sorting and tabulating machines.

While the illustrations used in this paper do not cover the entire expense which comes under the heading of casualty general administration, we believe that sufficient examples of methods and formulae have been included to give an idea of the practical application of the theory of distribution of such expense as followed in the companies with which we are associated and that further illustrations would involve little more than repetitions or variations on a general theme.

The paper has been submitted with the thought in mind that it may be of some advantage to place before this Society the results of our companies' efforts along the line of practical methods of equitably distributing administration expense to line of insurance. We made no claim that our methods and formulae have attained

perfection and scarcely expect that they will meet the unqualified approval of those in the Society involved or interested in this general subject. We appreciate that some of our formulae may be further refined and anticipating criticisms on this score we wish to say in advance that as respects most of the formulae in this category we have set up two criteria before adopting a simple rather than a complex formula; (1) Are the differences in the results produced by the two formulae material? (2) Is the additional expense incidental to the use of the more complex formula justified? If in our judgment the answers are in the negative, the simpler formula has been adopted.

A word concerning the results of our methods. Our policy has been to endeavor to find for each material group of salary expense a practical method or formula based upon sound theory, which will produce an equitable distribution by line of business. We have avoided so far as possible the use of premium ratio unless in our judgment such a basis provides an equitable distribution. We believe it is obvious from such examples as we have given that a large part of the expense of many of the larger departments should not be distributed on a premium basis. Accordingly, if our methods and formulae are reasonable, the test of the value and advantages of more refined methods is furnished by the results produced. A comparison of the percentage distributions of our total casualty administration expenses by the methods followed and those which would have been obtained by dividing expenses on the basis of written premiums is as follows:

Line of Business	Actual Distribution	Written Premium Distribution	Difference (2) — (3)	Per cent Variation (4) ÷ (2)
(1)	(2)	(3)	(4)	(5)
Compensation .....	30.27	36.04	— 5.77	19.06
Auto Liability .....	25.41	31.60	— 6.19	24.36
Other Liability .....	16.33	14.51	+ 1.82	11.15
Auto Property Damage..	11.55	8.58	+ 2.97	25.71
Auto Collision .....	1.29	.96	+ .33	25.58
Other Property Damage.	1.05	.78	+ .27	25.71
Boiler .....	3.22	1.59	+ 1.63	50.62
Machinery .....	.48	.38	+ .10	20.83
Burglary .....	7.77	4.28	+ 3.49	44.92
Glass .....	2.63	1.28	+ 1.35	51.33
	100.00	100.00		

It will be noted that there are rather wide variations percentage-wise between the proportions of expenses assigned to the various lines by the two methods of distribution. The closest agreement occurs for the Other Liability line. The variations are so substantial that there would appear to be very little question regarding the desirability of adopting methods of expense distribution along the lines indicated in this paper.

We do not wish to give the impression that we hold distribution of expense to line by premium formula in low esteem in all cases. Where no other logical method or formula appears to adequately and equitably solve the problem, we resort to a premium formula, since such a formula is at least consistent with the construction of the premium rate. We use at present a premium formula for distributing Automobile Underwriting Department salaries to coverage. We have tried various other methods and formulae in the past, but none have given what we consider consistent and reasonable results. We recognize the arguments against the use of the premium formula for distributing automobile underwriting expense, particularly as respects division of expense between personal injury and property damage. The main argument is that the cost of the various elements involved in the underwriting of a combined policy is only very slightly greater than would be the cost for issuing a policy for personal injury liability. The argument is good so far as it goes. However, there may be certain operations in an underwriting department, such as the computation of endorsement and cancelation premiums, where the relative costs by coverage may be rather close together. In some operations the cost of handling the property damage element may be greater than that for the personal injury element. If individual risk experience is maintained in the Underwriting Department, it will cost more in the aggregate to post the property damage losses because of the higher accident frequency for the property damage coverage. Measured in terms of premium the property damage frequency is several times that for personal injury. Considering the composite picture and appreciating the fact that the personal injury premium is on the average about four times the property damage premium, it is our opinion that the distribution of Automobile Underwriting Department expense to line on a premium basis gives defensible and probably reasonably accurate results.

We appreciate, of course, that expense allocation to line is not and never will become an exact science. We believe, however, that it can be developed to a point which will insure substantial equity as between lines of insurance. It is our hope that the paper will promote interesting and valuable discussion and encourage further efforts, particularly along the lines of such more advanced features of expense distribution as expense by size of risk and by state.