USING CLAIM DEPARTMENT WORK MEASUREMENT SYSTEMS TO DETERMINE CLAIM ADJUSTMENT EXPENSE RESERVES

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Abstract

This paper discusses a methodology for establishing reserves for the portion of loss adjustment expense associated with the cost of claim adjusters. The actuarial literature contains very little material on how to estimate unallocated loss adjustment expense (ULAE) reserves. The literature briefly mentions "transaction-based" methods that require claim department time studies. However, many feel that the improvement in estimating ULAE reserves does not justify the high cost of performing such a study. Fortunately, most claim departments of major insurance carriers and third party administrators now utilize sophisticated automated work measurement tools that may capture the type of data that can be used to perform an automated time study.

The first section describes a process that can be used to perform the work-study, including a discussion of the technical and practical issues in conducting such a study. The second section shows how the results of the study can be utilized to determine claim adjuster expense reserves. Other potential applications of the claim standards will be discussed, including pricing unbundled claim service, allocating claim department expense to line of business for statutory and management reporting purposes, and monitoring claim department expenses. Changes in the NAIC definition of loss adjustment expense are also discussed in the paper.

1. INTRODUCTION

This paper will illustrate a methodology for establishing the estimated liability for the portion of loss adjustment expense associated with the cost of claim adjusters. Common techniques that are used to determine these liabilities will be discussed at the beginning of this paper. The paper will then describe an alternative method of estimating these costs, using a claim department work-study. The study utilized an automated work measurement system to determine a standard cost of handling different types of claims. The paper will then describe how these claim standard costs can be used to determine outstanding liabilities for claim adjuster expense. Other applications of the study will be described in the final section.

A. Definition of Loss Adjustment Expense

Before discussing how to determine a reserve for claim adjuster expenses, it is first necessary to review changes in the definition of loss adjustment expenses. Claim adjuster expenses have been included in the traditional definition of unallocated loss adjustment expense (ULAE). In the past, there had been some inconsistency in the distinction between allocated and unallocated loss adjustment expenses. Part of the confusion resulted from the common assumption that the term "allocated" refers to expenses that could be identified with a specific claim file. Companies utilizing different business procedures to settle claims may thus have had different definitions for unallocated and allocated loss adjustment expense. This issue was further complicated because different definitions were used for statistical reporting.

To increase the consistency of reporting between insurers, the Casualty Actuarial (Technical) Task Force (CATF) recommended to the National Association of Insurance Commissioners (NAIC) Accounting Practices and Procedures (EX4) Task Force that a revised loss adjustment expense (LAE) definition be adopted [1]. The Accounting Practices and Procedures Task Force adopted the

change effective January 1, 1998. The task force's objective was consistent reporting of expenses related to defense, litigation, and medical cost containment regardless of whether a company uses its own employees or hires outside firms. To eliminate any confusion arising from the association of the term "allocated" with the ability to assign expenses to a specific claim, the NAIC approved a Blanks Proposal to change the titles effective with the 1999 Annual Statement.

Under the revised rules, the ability of an insurer to assign expenses to a specific claim no longer determines how it is classified. Defense, litigation, and medical cost containment expenses—both internal and external—are now assigned to "Defense & Cost Containment" (DCC); the remaining expenses associated with adjusting and recording claims are assigned to "Adjusting & Other."

Specifically, DCC now includes:

(i) surveillance expenses;

(ii) fixed amounts for medical cost containment expenses;

(iii) litigation management expenses;

(iv) loss adjustment expenses for participation in voluntary and involuntary market pools, if reported by accident year;

(v) fees or salaries for appraisers, private investigators, hearing representatives, reinspectors, and fraud investigators, if working in defense of a claim, and fees or salaries for rehabilitation nurses, if such cost is not included in losses;

(vi) attorney fees incurred owing to a duty to defend, even when other coverage does not exist; and

(vii) the cost of engaging experts.

Adjusting & Other is now defined as those loss adjustment expenses other than the DCC expenses as defined above. Adjusting & Other expenses include the following items:

(i) fees of adjusters and settling agents;

(ii) loss adjustment expenses for participation in voluntary and involuntary market pools, if reported by calendar year;

(iii) attorney fees incurred in the determination of coverage, including litigation between the insurer and the policyholder; and

(iv) fees or salaries for appraisers, private investigators, hearing representatives, reinspectors, and fraud investigators, if working in the capacity of an adjuster.

The claim department expense study discussed in this paper will focus on the first item in the above definition of Adjusting & Other expenses. These costs, which compose the largest portion of Adjusting & Other, will be referred to as "claim adjuster expenses" throughout the paper. Provisions for the other items included in the definition of Adjusting & Other must be calculated independently and added to the adjuster reserves determined by the methodology discussed in this paper.

B. Summary of Common Reserving Methods

The actuarial literature contains very few techniques for determining the outstanding liabilities for what has traditionally been called unallocated loss adjustment expense, or ULAE. The existing techniques fall into three categories:

- paid-to-paid methods
- methods based on claim reporting and closing patterns (the Johnson Method [2])
- transaction-based methods.

The paid-to-paid method—as well as its shortcomings—has been described in detail in the actuarial literature. Under this method, the historical ratio of calendar year ULAE payments to calendar year paid losses is calculated. The ULAE reserve is then determined by applying 100% of this ratio to the incurred but not reported (IBNR) reserve and 50% of this ratio to the case reserve. This methodology is based on the assumption that 50% of the ULAE is paid when a claim is opened and the remaining 50% of the ULAE is paid as losses are paid. It also assumes that the IBNR reserve only provides for pure IBNR claims.

Several authors (Kittel [3, p. 311] and Johnson [2]) have pointed out the shortcomings of the assumptions underlying this method. In particular, the use of a calendar year ratio will either understate or overstate the ULAE reserve in a changing claims environment. For example, if a line of business is growing, this method will understate the reserve. Similarly, if there is a change in the claim reporting and settlement pattern, this method will fail to produce the correct reserve. In addition, this method assumes that ULAE will inflate at the same rate as losses. Finally, this method assumes that the underlying loss reserves are adequate. It should be noted that the distortions in this method would be magnified for long-tailed lines of business.

The Johnson Method overcomes many of the problems associated with the traditional paid-to-paid methodology. The first step in this method is to calculate historical average ULAE expense per weighted open claim. The number of claims open at future year-end points is then projected based on claim reporting and settlement patterns. Finally, the ULAE reserve is calculated by multiplying the number of open claims by the trended average expense.

By relating calendar year ULAE to claim counts, Johnson recognizes that ULAE payments are not necessarily tied to loss payments. The ULAE reserve calculated by the Johnson Method is also independent of the adequacy of the underlying loss reserves.

In addition, the method is responsive to changes in exposures and inflation.

While the Johnson Method overcomes many of the shortcomings of the classical paid-to-paid methods, it has a major limitation: the technique is dependent on the allocation of ULAE to line of business. As Johnson [2, pp. 113–114] noted:

> One of the problems with unallocated loss adjustment expenses is that it is difficult to test one's assumptions about them because the expenses by definition are generally hard to allocate and therefore hard to track. The only real way that comes to mind to test assumptions would be to conduct a claim expense study, such as a time and motion study, which establishes artificial expense allocation procedures for a temporary time period.

The allocation of calendar year ULAE to line may not be an issue for a company writing only a single line of business or for a company that has fully dedicated claim staff for each line. However, it can be a significant issue for insurance companies that utilize multi-line claim offices. Any distortions from a misallocation of calendar ULAE will, in turn, distort the average ULAE used to estimate the reserve. In her paper, Johnson [2] uses a growing book of medical malpractice business in a single state as an example. She notes that the dramatic annual 17.4% trend in the calendar year average ULAE was surprising. Johnson does not describe the company that generated the data in the example or the methodology used to allocate calendar year ULAE to line of business and state. It is, therefore, not possible to determine if the increase in calendar year ULAE was due to the calendar year allocation methodology. However, this example illustrates the reliance of Johnson's technique on the calendar year ULAE allocation methodology.

Johnson, among other authors, has acknowledged that the only way to accurately determine the true cost of handling vari-

ous types of claims is to conduct a claim department work-study. However, all of these authors recognize that such a study would have been very time-consuming. It would have involved literally standing over a claim adjuster's desk armed with a stopwatch or requiring claims adjusters to track every minute of their time. Improving the measurement of ULAE liabilities would probably not suffice to justify the high cost of performing such a study. Fortunately, today's modern technology offers a more efficient and accurate way of conducting such a study.

2. OVERVIEW OF CLAIM DEPARTMENT EXPENSE STUDY

A. Big Brother Is Watching

Most modern claim departments utilize automated claim systems. Claim representatives use these systems to perform the various functions involved in the claim process, such as opening claims and making payments, as well as adding notes and composing correspondence. In fact, much of an inside claim representative's day is spent at the computer. Many of these systems capture the individual transaction detail, along with the duration of time spent on each type of activity. This data will often identify the claim staff position performing the task, as well as the claim generating the activity. Multiplying the duration of activity for each transaction times the average hourly cost of the claim position performing the task yields the cost of performing the transaction. Dividing the sum of all the transaction costs by the number of claims yields the average cost of handling a claim.

This paper describes an actual claim study utilizing an automated work measurement system and its application to determining the reserve for unallocated loss adjustment expense. While the use of an automated work measurement system greatly simplified the effort of performing a claim study, the project involved an investment of significant resources. The cost of such an investment goes beyond the benefit that would be derived by merely improving the accuracy of the estimation of ULAE liabilities. In

fact, the main justification for this study was an improvement in the allocation of claim costs to product and profit center, which, in turn, would enhance the accuracy of product pricing.

B. Claim Data Utilized in the Study

The data that is available in the claim system varies by company. Hence, the design of the claim department study will be governed by the data captured in the system. The data elements used for the claim study in this paper are discussed below.

Claim Data identifies the individual claim that generated the activity:

- Claim Symbol—identifies the coverage that generated the claim.
- Claim Office—identifies the branch office that is handling the claim.
- Age of Claim—the automated work measurement system utilized in our claim study classified claims into four age classifications:
  - (i) Intake—this category represents the work that is performed in the first 30 days of the claim.
  - (ii) Outstanding 31–90 Days (OS1)—this category represents the work that is done in the next 60 days in the life of the claim.
  - (iii) Outstanding $>$ 90 Days (OS2)—this category represents the work that is done on claims that are over 90 days old. For workers compensation, this category excludes claims that are older than 60 months, which were handled separately.
  - (iv) Outstanding $>$ 60 Months (OS3)—this category, which was utilized only for workers compensation, represents the work that is done on claims that are more than five

years old. For the sake of simplicity, the calculation for this category is not illustrated in this paper.

The choice of these claim categories was governed by the claim system that we used to perform the study. Other classifications could be used. For example, we considered adding a category for claim settlement to reflect the work to close a claim. However, we decided not to do so when we learned that the claim file might not be officially closed in the month in which the claim actually settled. Claims may be kept open until all the final bills have been paid and any recoveries (such as salvage, subrogation and second injury funds) have been collected. For this reason, the work in the final month the claim is open may not accurately reflect the work associated with settling a claim.

When undertaking a claim work-study, it is important to understand how the claim system counts claims. Some claim systems count all the claimants from an occurrence as a single claim, while other systems create individual claim files for each claimant and coverage. For example, an automobile accident may generate one or more bodily injury claims, a property damage liability claim and a physical damage claim. Another consideration is how reopened claims are handled—some systems utilize the original claim number, while others create a new claim.

Policy Data identifies the business unit that wrote the policy that generated the claim. Depending on the business needs of the organization, the following level of detail may be included in the claim study:

- Regional Office
- Risk State
- Market Segment

In a multi-line insurance company, the claim study may distinguish between personal and commercial business. A com-

pany writing commercial lines may wish to further distinguish between small commercial, middle market, and large national account policies if it is felt that the costs of handling these claims are different. For the same reason, the company may wish to separately identify assigned risk claims. In our study, we found that large national account claims required less handling time than standard business. It was believed that this was because large accounts normally have a large volume of claims. These accounts typically have a risk management department with defined claim reporting procedures that assists in the claim process by gathering the necessary information and providing it to the claim adjuster. Smaller accounts have very few claims, and therefore are less experienced in handling claims. Assigned risk claims were found to have the highest claim adjuster costs.

Work Measurement Data is the basis for the cost of handling the claim. We utilized the following information from our claim system:

- Type of Transaction—this data element identifies the type of activity on the claim file. Examples of transactions include creating a claim, making a payment, and adding notes to the file.

- Claim Position—this data element is the job classification of the claim representative that performed the activity on the claim. Examples of job classifications include claim representative (inside and outside), clerical and supervisor.

- Duration of Transaction—this item measures the length of time expended performing a task.

Claim Expense Data is required to determine the cost of handling each transaction. To estimate these costs, it was necessary to collect salary data by claim position, as well as other expenses such as benefits, rent, automobile, travel, etc.

3. STEPS IN PERFORMING A CLAIM DEPARTMENT STUDY

The steps involved in performing a claim department study are summarized below:

1. Determine average hourly cost for each claim position
2. Collect duration of claim transactions by claim position
3. Determine raw costs by multiplying durations by average costs for each claim position
4. Load standards for unrecorded time
5. Divide costs by claim volumes to determine average cost
6. Load standards for other field office claim overhead not captured in the work-study
7. Load standards for home office claim adjustment expense overhead

Each of the above steps will be discussed in more depth in subsequent sections using workers compensation lost-time claims as an example. Because workers compensation claims with lost work time have very different characteristics than medical-only claims, we chose to calculate separate standards for each category. It should be noted that the data in the exhibits have been disguised to preserve confidentiality.

Step 1: Determine Average Hourly Cost for Each Claim Position

The claim-handling costs underlying the work-study are determined by multiplying the time every claim position spent handling a claim times the average hourly cost for that claim position. The first step in the study is to determine the average hourly cost for each position in the claim study. Exhibit 1 shows the calculation of the average hourly cost. For our study, we used annualized countrywide average salary levels for each position, loaded for benefits and other expenses. The hourly cost is based

on 50 weeks per year at $36\frac{1}{4}$ hours per week for each staff position. The use of countrywide salary levels reduces the bias from using a sampling of claim offices. Benefits are loaded as a flat 30% of salary. Other expense categories, such as rent and furniture and equipment, are allocated to position. Certain categories, such as automobile expense, should be allocated only to the job categories that generate those expenses. Depending on the nature of the expense categories, the allocations may be based on salaries, headcount or any other reasonable basis for allocation.

When we performed our study, we found that the system captured a sufficient proportion of time at the individual claim level for only five positions (inside claim representative, outside claim representative, clerical, supervisor and claim processor). We chose to include only those positions in the work-study, accounting for 64.3% of the total claim field costs. The costs for the remaining positions will be reflected in a Field Office Overhead Factor, discussed later.

Step 2: Collect Duration of Claim Transactions by Claim Position

Exhibits 2, 3, and 5 are each divided into three sections representing the three age categories in the study: Intake, OS1 and OS2. Exhibit 2 displays the number of hours recorded in the claim system for each of the job positions that handled workers compensation lost-time claims during the study. The number of claims handled in each category is shown at the bottom of each section. For example, in Office #1, inside claim representatives spent a total of 387.5 hours handling the intake of 585 lost-time claims. Other positions, including outside claim representatives, clerical, claim processors, and supervisors, also worked on these claims. The system recorded a total of 825.8 hours of staff time handling lost-time claim intake in this office. During the same time period, there were 996 open claims that were between 31 and 90 days old in Office #1. The system recorded a total of 554.6 hours handling these claims. Finally, 1,879.3 hours were

captured for the 4,600 claims that were between 90 days and 60 months old.

It should be noted that several positions—such as supervisor, claim representative, and clerical staff—perform activities on a single claim. At the same time, there are many claims that do not have any activity on them in the month. The standard that we are calculating represents the average monthly cost of handling an open claim.

Step 3: Determine Raw Recorded Costs by Multiplying Durations by Average Salaries

In Exhibit 3, the average hourly cost of the position handling the claim is multiplied by the duration of the task to determine the total cost. For example, the average hourly cost of an inside claim representative is $29.95. This hourly cost is multiplied times the 387.5 hours spent handling intake claims to get a cost of $11,607 for Office #1. The costs are calculated similarly for the other job categories.

Step 4: Load Costs for Unrecorded Time

The average costs determined above must be adjusted to reflect the fact that 100% of work time is not recorded in the claim system for the positions in the study. Exhibit 4 shows the time that was captured in the claim system for each position in Office #1 during the four-month study period. It should be noted that this exhibit reflects the total time recorded for each position during the study period and includes work on all types of claims. For this reason, the number of recorded hours exceeds the hours shown in the sample for workers compensation lost-time claims. The number of available hours is equal to the staff count times the number of work hours during the study period. The number of hours recorded at the claim level reflects the time that is spent working on a specific claim. Examples of time that is not recorded at the claim file level include absence and vacation time, training, and customer service. Note that the percent of

time recorded at the claim level varies significantly by the type of position. The system captures the largest proportion of time for claim processors. On the other hand, only 28.9% of clerical time can be recorded to specific claims. The proportion of time recorded is summarized for each position and office at the bottom of Exhibit 4.

To adjust for the time that cannot be allocated to specific claims, the costs determined in Exhibit 3 are grossed up by dividing the cost by the percent of time recorded for each position in each office (see Exhibit 5). For example, the $11,607 of costs for inside claim representatives in Office #1 is divided by the 66.6% time recorded to obtain a grossed-up cost of $17,428. In using a factor to gross up the costs, we are allocating unrecorded time for each claim in the same proportion as the recorded time.

Step 5: Determine Average Costs by Claim Category

The calculation of the average monthly costs for workers compensation lost-time claims for each of the claim categories is displayed at the bottom of each section in Exhibit 5. For each of the age categories, the average cost was calculated by dividing the grossed-up costs for all offices by the number of claims that were handled in the age category during the study period. Dividing the total intake costs of $273,505 by the claim intake of 2,645 yields a preliminary standard of $103.40 for handling a lost-time claim intake. Since the claim intake includes all claims that were reported during the four-month study period, the resulting standard represents the average monthly cost that is incurred on a lost-time claim in the first month that it is reported to the company.

In determining the number of outstanding claims in the averages for the OS1 and OS2 categories, every claim in the office is counted once for each month that it is open during the study period, regardless of whether there was any activity on the claim. For example, if a claim were open for the first three months of the study and then closed, it would produce a count of three. As

a result, the calculated standards represent the average monthly cost of handling outstanding claims.

At this point, it may be appropriate to apply judgment in selecting the final standards. Unusual results for any office and category should be reviewed. For example, the costs for Office #3 consistently fall below the costs in the other offices. The statistics for this office should be validated to make sure that all the data were collected properly. Given the data are correct, the reasons for the lower cost should be explored. One possible explanation for the lower cost may be that the workers compensation laws in the jurisdictions served by the office make it easier to adjudicate claims. If it is felt that the data for this office is anomalous, it may be appropriate to exclude it from the final selection of the standards.

Step 6: Load Standards for Other Field Office Claim Overhead

As mentioned above, not all the staff in a field claim office actually handles claims in the system. For example, the claim office staff may include an office manager, system administrator, and quality assurance and training resources, as well as clerical and mailroom staff. These field costs must also be factored into the claim standards. In our study, these costs were added using a percentage factor. Since the positions included in the work-study accounted for 64.3% of total claim expenses, the standards were multiplied by 1.555 (1/.643) in Exhibit 6. In making this adjustment, we are again allocating field office overhead to claim in the same proportion as the staff handling time captured in the system at the claim level.

Step 7: Load Standards for Home Office Claim Adjuster Expense Overhead

In addition to the field overhead discussed above, claim adjuster expense also includes home office claim department costs, as well as general overhead. Examples of the types of expenses included in overhead are shown in Exhibit 7. The general over-

head factor was calculated by dividing the annual overhead cost of $66,976 by the total claim field expenses of $174,933 from Exhibit 1. General Overhead was reflected by multiplying the standards in Exhibit 6 by a factor of 1.383.

4. USING THE CLAIM STANDARDS TO CALCULATE THE CLAIM ADJUSTER EXPENSE RESERVE

The standards developed in the claim work-study can be used as the basis for the calculation of the claim adjuster expense reserve. Kay Rahardjo described a technique for doing so in her paper, "A Methodology for Pricing and Reserving for Claim Expenses in Workers Compensation" [4].

The major steps in Rahardjo's paper are:

(i) project ultimate claim counts using triangles of open and reported claims,

(ii) determine the number of claims open at various development ages, and

(iii) calculate the reserve by multiplying the number of open claims by the cost per outstanding claim.

The remaining exhibits in the paper illustrate the application of this methodology using a simplified example to calculate the required ULAE reserve as of 12/31/97. Modifications to Rahardjo's methodology will also be discussed.

In the reserve evaluation described below, we have elected to calculate the reserves for reported claims and IBNR claims separately. When claim service is sold on an unbundled basis, the revenue for claim service is typically collected when the claim is *reported*, and the claim administrator has no obligation to handle the claims that have not yet been reported. In such situations, including only reported claims in the claim adjuster expense reserve is appropriate. However, when the revenue for

claim service is included in the insurance premium and the insurance carrier has the obligation to handle all claims that are reported, the claim adjuster expense reserve must include a provision for pure IBNR claims. Calculating the reserve separately for reported and IBNR claims provides the flexibility to address both situations.

A. Projection of Ultimate Claim Counts

Exhibit 8 shows a report year triangle of reported claim counts that forms the basis of the projection of ultimate claim counts. At the bottom of the exhibit, development factors are calculated using standard methodologies to project the claim counts to ultimate. For the sake of simplicity, it is assumed that there is no development in the report year claim counts after 12 months.

B. Projection of Outstanding Claim Counts

A report year triangle of outstanding claim counts is displayed in the top portion of Exhibit 9. It is important to emphasize that the definition of claim counts used in the reserving triangles must be consistent with the definition used to generate the average costs in the claim study. Exhibit 9 illustrates the method described in Rahardjo's paper to project outstanding claim counts. The number of outstanding claims at future development intervals is projected by calculating the ratio of outstanding claims to ultimate claims at historical points. These ratios are selected for each development age and are used to calculate the number of outstanding claims at future year-end development points. More sophisticated assumptions about the claim closing patterns during the development period could be used. For example, link ratios could be used to project the number of outstanding claims at each development age. Alternatively, the number of claims closed at each age could be estimated by using ratios of closed claims to the number of claims open at the beginning of the interval.

C. Projection of Claim Adjuster Expenses

Exhibit 10 illustrates how the total claim adjuster expenses are calculated by multiplying the number of claims at each development interval times the cost of handling a claim. The average number of outstanding claims shown at the top of the exhibit is calculated by averaging the number of claims outstanding at the beginning and end of the development interval in Exhibit 9. Use of the average number of outstanding claims reflects the fact that some of the claims that are open at the beginning of the interval will be closed.

The monthly standard claim costs developed in the claim study are the starting point for the estimates of future claim adjuster expenses. For the sake of simplicity, the reserve evaluation utilizes triangles with annual development points. Consequently, the monthly standard costs from the claim study must be converted into annual costs so that they are on a comparable basis. Since our standard varies with the age of the outstanding claim, the monthly standard costs must be weighted to reflect the mix by age of outstanding claims. Exhibit 11 shows how this conversion can be made.

Recall that in our claim study, the intake standard reflects the work that takes place in the month in which the claim is reported. A claim that remains open incurs the 31–90 day (OS1) cost for the next two months and then incurs the OS2 cost for months 4 through 60. Report year claims that are open between 12 and 24 months incur 3/12 months of the OS1 cost and 141/12 months of the OS2 cost, or $613.04. After 24 months, open claims incur 12 months of OS2 costs ($597.60) for each year that they are open up to 60 months.

Between 60 and 72 months, it is again necessary to adjust the standard to reflect the mix by age. The bottom section of Exhibit 11 shows that between 61 and 72 months open claims incur 66/12 months of the OS2 cost and 78/12 months of the OS3 cost, or $384.40 per year. After 72 months, all open claims

incur the OS3 cost of $17 per month, or $204.00 per year. The average costs calculated in the claim study are at 1997 cost levels. To reflect future costs, the 1997 standards are trended using an inflation assumption of 3% per year in the middle section of Exhibit 10.

D. Determination of Claim Adjuster Expense Reserve for Reported Claims

Once the future claim costs are estimated, calculating the claim adjuster expense reserve is simply a matter of summing the claim adjuster expenses for future development ages. If we make the simplifying assumption that a claim incurs the intake cost on the day it is reported, it is not necessary to include this cost in the reserve for reported claims. This calculation is illustrated in the bottom section of Exhibit 10 for a 12/31/97 reserve evaluation date.

For a long-tailed line such as workers compensation, it is necessary to include a provision for expenses incurred beyond ten years. Rahardjo [4] describes a methodology for determining a tail for workers compensation tabular claims that uses mortality assumptions. The tail reserve must include appropriate inflation assumptions.

E. Determination of Reserve for IBNR Claims

The top section of Exhibit 12 shows projected IBNR claims by accident year and development period. Any standard method for calculating the number of pure IBNR claims could be utilized. To select the expected ultimate cost per IBNR claim, we examine historical average ultimate claim adjuster expense per claim. The historical average costs are calculated in Exhibit 13 by dividing the total ultimate adjuster costs by the ultimate number of claims from Exhibit 8.

Ultimate costs are calculated by report year in Exhibit 14 through Exhibit 16. The ultimate adjuster costs must include the

intake cost of handling a claim in the first month that it is reported to the company, as well as the cost of handling the claim for each month that it is outstanding. The average cost per outstanding claim for development ages beyond the first 12 months can be calculated in the same manner as in Exhibit 10. Since we are calculating ultimate costs, the costs for all development ages must be included. The 1997 average costs from the claim study have been adjusted in Exhibit 15 to reflect both historical and future cost levels. Future costs are calculated by applying an inflation factor of 3% per year to the 1997 standards. Historical costs are similarly calculated by detrending the 1997 standards at a rate of 3% per year. If actual historical average claim costs are available for prior years, they can be substituted for the detrended costs.

The calculation of costs for the first 12 months in the life of a claim, which is illustrated in Exhibit 17 and Exhibit 18, is more complicated. The calculation must include the intake cost for every claim that is reported to the company. It must also reflect the claims that are settled before the end of the year. In the claim study, all costs for the first month that the claim is open are reflected in the average intake cost, which was developed in Exhibit 6. The costs for the second and subsequent development months of a report year are calculated by multiplying the appropriate standard times the percentage of claims that remain open. The monthly costs are then accumulated for each report month. The final cost for the first year, $444.17, is calculated by averaging the total costs for each report month. Again, this must be adjusted to historical cost levels. The costs for the first 12 months are then combined with the costs for subsequent development periods in Exhibit 16 to get the total ultimate claim adjuster costs.

The ultimate report year cost per claim is calculated in Exhibit 13 by dividing the total ultimate cost by the ultimate number of claims. Since IBNR claims for the 12/31/97 reserve will emerge in 1998 and subsequent report years, the historical average costs

in Exhibit 13 are then brought to 1998 cost levels using an inflation assumption of 3%. An expected average cost per claim is then selected.

The number of IBNR claims can then be multiplied by an expected ultimate cost per claim to derive the claim adjuster expense reserve for IBNR claims shown in Exhibit 12. The expected ultimate cost per IBNR claim selected in Exhibit 13 should be trended to reflect cost levels in the year that the IBNR claim emerges. By using the historical report year ultimate cost per claim, we assume that the cost of handling an IBNR claim is the same as the cost of handling a claim that has already been reported.

Finally, in Exhibit 19, the total claim adjuster expense reserve is the sum of the reserves for reported and IBNR claims. It should be noted that the total Adjusting and Other (A&O) reserve must include a provision for the other components of A&O that are not reflected in the claim expense study.

5. PRACTICAL CONSIDERATIONS IN CONDUCTING THE CLAIM STUDY

A. Scope of the Study

When setting up the study, one important consideration is its scope. One of the first decisions that must be made is whether to include the entire population of claim offices in the study. Because the volume of data that is collected at the transaction level is so extensive, it may not be possible to include all the claim offices. Instead, it may be more practical to include a sample of claim offices. If the decision is made to only sample claim offices, it is important to select offices that provide a representative sample of the company's geographical mix. The use of country-wide salary levels when calculating average costs can mitigate geographic differences in cost of living. However, variations in state claim adjudication requirements for certain lines, such as workers compensation, can significantly impact claim costs. It is

also important to make sure that the mix of claims by age in the sample offices reflects the mix for the total claim population.

Our study included five sample offices that handled workers compensation claims, accounting for approximately 20% of our claim volume. It should be noted that an automated work measurement study allows a much larger sample size than would be practical under a traditional time and motion study.

B. Duration of Study

Another consideration is the time period for the study. Our claim study spanned four months. When conducting a work-study, it is important to select a representative time period. It makes sense to avoid unusual times, such as holidays. In addition, it is important to avoid periods when the office is handling a heavy volume of catastrophe claims. Even with these caveats, it may be necessary to adjust the data for months that have fewer workdays.

C. Credibility

There may not be sufficient volume in every claim category to select valid standards. In our study, we selected different standards by market segment. However, certain claim categories such as auto uninsured motorist did not have a sufficient volume of claim data. For these categories, we selected data for all market segments combined.

D. Adjusting the Data for Anomalies in Claim Transaction Durations

We found several data issues that required adjustment. A significant issue was unusually long durations for individual transactions compared to the norm. We learned that these anomalies typically occurred when the claim representative was interrupted in the middle of a transaction. In order to address this issue, we elected to cap any value for a transaction that exceeded the mean by more than three standard deviations.

E. Participation of Claim Department Personnel

Active participation by the claim department is essential to a successful claim work-study. Before undertaking the study, it is important to thoroughly understand the claim system and how adjusters utilize it. In enlisting the cooperation of the claim office staff, it is useful to explain the purpose of the study and to provide appropriate assurances that the goal of the study is not to reduce staff. Cooperation from the claim office staff—particularly the manager and systems administrator—during the data collection phase is crucial. To ensure all the data are collected, it is important to make sure that the system is fully operational and that all the data files are retained. The study team should be notified of any outages during work hours; data for days with outages may need to be excluded from the study, and appropriate adjustments must be made. Adjustments may also be necessary if there is a significant departure from the typical workload, such as an all-day training session.

After preliminary results are tabulated, it is useful to review them with a cross section of claim staff. While the staff may not be able to validate the actual average dollar cost of each type of claim, they may provide valuable insights into the cost differentials among different types of claims or the cost of handling similar claims for different market segments.

F. Other Participants in the Study

A cross-functional team was critical to the success of the claim study. Since the project was originally designed as a cost allocation study, controllers played a central role in the design and execution of the study. The study team included several staff members from both claims financial and cost accounting areas, as well as two actuaries from the claims actuarial area. A representative from the claims work measurement unit also served on the team. It was also helpful to have a systems analyst and programmer dedicated to the project. In addition, actuaries and

controllers from the market segments and the corporate actuarial unit peer-reviewed the results of the study.

G. Final Validation of the Claim Standards

As a final validation of the claim standards, the study team tried to replicate actual claim adjustment expense spending levels using the standards. The standards (loaded for claim office overhead) were multiplied times the number of claims processed within each category in a given quarter and the results were summed. The fact that the total was within 2% of the actual claim adjuster expense spent during that time period helped demonstrate that the standards were reasonable.

H. Adjusting the Standards for Inflation and Trend in Claim Department Costs

Since conducting this type of claim study requires a significant resource investment, it is not practical to update it frequently. For this reason, it is necessary to adjust the standards for inflation in claim department costs. The simplest solution is to multiply the standards times an inflation factor. An alternative method is to update the salary and other expense data used in calculating the average hourly cost in Exhibit 1. However, neither of these methods recognizes productivity changes resulting from the claim department handling a higher or lower volume of claims with the same amount of staff.

A more refined approach can be used to adjust the standards. Each quarter, the actual spending in each claim office can be compared to the indicated claim adjuster expense that results from applying the standards to the claim volume. This is similar to the exercise described in the previous section that was used to validate the standards. The ratio of actual expenses to indicated expenses could be used to adjust the claim standards for inflation and productivity changes. This ratio can also be calculated at a claim office level and applied to the countrywide claim standards

to customize the standards by claim office. Of course, it is important to note that this approach assumes that all types of claims in the office will inflate at the same rate. It also implies that the relativity among the standards for different types of claims will remain constant over time and across claim offices.

I. Adjusting the Standards for Changes in Claim Department Work Flow

While the above adjustment makes it unnecessary to update the standards every year to reflect inflation, it is necessary to modify the standards when there is a material change in claim department workflow. Examples of changes that may impact the standards are the creation of a centralized 800 number for claim reporting, changes in the process for reviewing and paying medical bills, and other managed care initiatives. In addition, outsourcing certain claim functions (such as case management, appraisals or fraud management) may require adjustments to the standards.

J. Workers Compensation Claims Greater Than 60 Months Old

The treatment of claims in the tail is an important consideration, particularly in a long-tailed line such as workers compensation. In workers compensation, claims that are open beyond a certain age require much less attention. Typically, when workers compensation claims reach this age, the investigation of the claim has been concluded. Weekly indemnity payments, and occasional medical payments, are processed with little intervention from a claim representative. For this reason, the claim adjuster expenses associated with these claim files are considerably lower. Accordingly, we established a separate OS3 cost for workers compensation "maintenance claim files" open longer than five years and excluded claims open more than five years from the OS2 age category. For the sake of simplicity, the calculation of the OS3 cost for workers compensation claims older than five years is not illustrated in this paper.

6. OTHER APPLICATIONS FOR CLAIM STUDY

In addition to calculating the claim adjuster expense reserve, the standards have several other practical applications: allocating claim adjuster expense to line of business for statutory and management reporting, pricing unbundled claim service, and monitoring claim department expenses.

A. Allocation of Claim Adjuster Expense

In many companies, internal claim adjuster expense is not typically assigned to a specific claim. For this reason, it is often impossible to identify these expenses by claim type and line of business. This becomes a particularly difficult issue when a single claim unit handles several different types of claims or the same type of claims for different market segments. The standards that are determined in this study could form the basis of an expense allocation system. As mentioned above, the original purpose of our claim study was to develop a new claim expense allocation system.

In our allocation methodology, the system tabulates the number of claims reported to the office and the number of claims in each age category. The monthly claim counts are then multiplied by the appropriate standard for the claim type and age category. The results are then summed by claim office to determine the indicated claim expense for each office. The indicated claim expense is compared to the actual claim expense in the office and the standards are adjusted to balance to the actual spending. Depending on individual company data reporting needs, the results can be summarized at various levels of detail. For internal management reporting, the data may be summarized by market segment and subline, branch office, and state. For Annual Statement reporting, the data may be tabulated by statutory line and state. In addition, the data may be further summarized by accident year.

B. Allocation of Adjusting and Other Expense Payments in Schedule P

The above method provides a methodology to allocate Adjusting and Other Expense to accident year in Schedule P. Prior to the 1997 Blank, the instructions to the Annual Statement prescribed a methodology—commonly referred to as the "45/5 Rule"—to allocate ULAE payments and reserves to accident year. The rule allocates calendar year ULAE payments as follows: (1) 45% to the most recent accident year, (2) 5% to the next most recent year, and (3) the balance in proportion to the amount of loss payments for each accident year during the most recent calendar year. This allocation method is based on the assumption that half of the ULAE is incurred when the loss is reported and the other half is incurred as loss payments are made. In addition, the method assumes that 90% of claims are reported in the same year as the accident year and the remaining 10% are reported in the following year. Of course, these assumptions do not apply to most lines of business typically written by today's insurers. The old Annual Statement rule was repealed effective with the 1997 Blank. The revised rule states that insurers should now apportion Adjusting and Other Expense payments and reserves by year based on claim counts using any appropriate method. The claim department standards described in this paper can be multiplied by accident year claim counts for each annual statement line to form the basis of the allocation of Adjusting and Other Expense payments in Schedule P.

C. Pricing Claim Service

Another important application of the claim standards is the pricing of claim service. The ultimate claim costs estimated above can form the basis of a handle-to-conclusion charge for insurance companies and third party administrators. In addition, assigned risk servicing carriers for workers compensation and automobile insurance can use these claim standards to reflect the cost of handling claims in the servicing carrier allowance in

their bids. As an in-depth discussion of pricing is beyond the scope of this paper, the reader should refer to Rahardjo's paper [4, pp. 164–167] for more details.

D. Claim Department Expense Planning, Monitoring and Control

In addition to the applications discussed above, the claim study provides a set of tools to plan and monitor claim department costs. Future claim adjuster expenses can be forecasted using a projection of future adjuster costs similar to the triangles displayed in Exhibit 10 for reported claims and Exhibit 12 for incurred but not reported claims. Such a forecast can form the foundation of claim department budgets.

The work-study also produces useful monitoring statistics. As Exhibit 5 shows, the cost of handling each type of claim varies substantially by office. These average costs can be used to benchmark claim office productivity. Since the length of time that a claim remains open directly influences the cost of handling the claim, it is also important to monitor claim closing patterns. The triangle of ratios shown in Exhibit 9 provides a useful tool to monitor the proportion of claims remaining open.

7. SUMMARY

While the claim work-study described in this paper is simpler to conduct than the traditional time and motion study, it still involves a considerable amount of work. However, a claim work-study approach offers many advantages. The work-study more closely reflects the actual work involved in creating and handling different types of claims. The method is responsive to changes in claim volumes and is independent of loss payment patterns and the adequacy of loss reserves. The standards can be adjusted to explicitly reflect trends in claim department costs due to inflation and productivity changes. Finally, the work products resulting from the study provide useful operational tools for

monitoring claim department expenses. The amount of work involved in conducting such a study is a worthwhile tradeoff for improvement in the accuracy of reserving, pricing, and monitoring claim adjustment expense.

REFERENCES

[1] Casualty Actuarial (Technical) Task Force, "Clarification of Revised ALAE Definition," 6/24/97 Draft.

[2] Johnson, Wendy A., "Determination of Outstanding Liabilities for Unallocated Loss Adjustment Expenses," *PCAS* LXXVI, 1989, pp. 111–125.

[3] Kittel, John, "Unallocated Loss Adjustment Expense Reserves in an Inflationary Economic Environment," Casualty Actuarial Society Discussion Paper Program, May 1981, pp. 311–331.

[4] Rahardjo, Kay Kellogg, "A Methodology for Pricing and Reserving for Claim Expenses in Workers Compensation," Casualty Actuarial Society *Forum*, Summer 1996, pp. 151–184.

EXHIBIT 1

TOTAL COUNTRYWIDE FIELD CLAIM EXPENSES

	$(000)						
Position	(1) Staff	(2) Salary & Benefits	(3) Auto	(4) Travel	(5) Other	(6) Total Field Expenses	(7) Field Cost per Hour[#]
Trainee	24	940	—	—	329	1,268	29.16
Systems Administrator	57	2,538	—	—	776	3,314	32.08
Manager	80	8,174	—	333	1,088	9,596	66.18
*Inside Claim Representative	513	20,827	—	—	7,021	27,848	29.95
*Outside Claim Representative	265	12,855	1,930	1,109	3,621	19,515	40.63
*Clerical	904	24,640	—	—	12,374	37,014	22.59
Clerical Supervisor	31	1,184	—	—	424	1,608	28.62
Health Service Representative	67	3,453	209	122	425	4,209	34.66
Claim Processing Supervisor	57	2,748	—	—	780	3,528	34.15
*Claim Processor	195	6,539	—	—	2,672	9,211	26.06
Compensation Processor	41	1,302	—	—	557	1,859	25.01
Auto Service Rep./Supervisor	112	5,616	686	154	649	7,105	35.00
Claim Assistant	99	2,725	—	—	1,355	4,080	22.74
General Adjuster	26	1,747	105	127	136	2,115	44.88
Hearing Representative	14	887	102	59	192	1,240	48.85
File Supervisor	156	9,583	—	—	2,129	11,712	41.42
Assistant Manager	125	9,116	—	—	1,716	10,832	47.81
*Supervisor	261	15,305	—	—	3,575	18,880	39.91
Total Field	3,027	130,178	3,033	1,904	39,818	174,933	
Sum of Expenses Included in Study	2,138	80,166	1,930	1,109	29,263	112,467	
% of Total Field Expenses Included in Study	70.6%	61.6%				64.3%	
Field Overhead Factor (1/.643) = 1.555							

*positions included in study

[#]based on 50 weeks at 36.25 hours per week

EXHIBIT 2

SUMMARY OF CLAIM TRANSACTION DURATIONS

Age Category: Intake

Avg. Hourly Cost	Position Name	Number of Hours				
		Office #1	Office #2	Office #3	Office #4	Office #5
$29.95	Inside Claim Representative	387.5	148.7	252.9	783.5	347.4
$40.63	Outside Claim Representative	74.2	243.7	68.6	38.9	49.6
$22.59	Clerical	129.9	120.9	52.7	398.1	91.0
$39.91	Supervisor	112.1	91.6	75.8	274.4	686.5
$26.06	Claim Processor	122.0	7.0	233.8	171.3	154.4
	Total Hours	825.8	612.0	683.8	1,666.1	1,329.0
	Number of Claims	585	304	654	650	452

Age Category: Outstanding 31–90 Days

Avg. Hourly Cost	Position Name	Number of Hours				
		Office #1	Office #2	Office #3	Office #4	Office #5
$29.95	Inside Claim Representative	241.2	69.6	175.9	735.1	241.9
$40.63	Outside Claim Representative	32.9	146.4	30.3	17.6	42.7
$22.59	Clerical	86.1	132.1	65.7	366.3	263.2
$39.91	Supervisor	134.9	79.6	122.4	363.8	227.7
$26.06	Claim Processor	59.5	4.4	142.6	158.1	106.7
	Total Hours	554.6	432.1	536.9	1,640.8	882.2
	Number of Claims	996	518	948	1,176	667

Age Category: Outstanding > 90 Days

Avg. Hourly Cost	Position Name	Number of Hours				
		Office #1	Office #2	Office #3	Office #4	Office #5
$29.95	Inside Claim Representative	736.0	157.6	712.5	1,928.7	971.9
$40.63	Outside Claim Representative	68.7	378.3	93.6	182.3	93.7
$22.59	Clerical	294.4	336.3	251.9	1,381.8	234.2
$39.91	Supervisor	662.4	483.4	914.0	978.8	187.4
$26.06	Claim Processor	117.8	10.5	453.4	374.2	181.5
	Total Hours	1,879.3	1,366.1	2,425.3	4,845.8	1,668.7
	Number of Claims	4,600	3,284	6,747	8,996	5,489

EXHIBIT 3

DEVELOPMENT OF RAW RECORDED COSTS

Age Category: Intake

Avg. Hourly Cost	Position Name	Total Recorded Costs Office #1	Office #2	Office #3	Office #4	Office #5	Total
$29.95	Inside Claim Representative	11,607	4,454	7,575	23,465	10,405	57,506
$40.63	Outside Claim Representative	3,016	9,900	2,788	1,579	2,016	19,299
$22.59	Clerical	2,934	2,731	1,190	8,993	2,055	17,903
$39.91	Supervisor	4,472	3,656	3,025	10,950	27,400	49,503
$26.06	Claim Processor	3,180	184	6,092	4,464	4,024	17,944
	Total	25,209	20,925	20,670	49,451	45,900	162,156
	Number of Claims	585	304	654	650	452	2,645

Age Category: Outstanding 31–90 Days

Avg. Hourly Cost	Position Name	Total Recorded Costs Office #1	Office #2	Office #3	Office #4	Office #5	Total
$29.95	Inside Claim Representative	7,223	2,085	5,270	22,016	7,245	43,838
$40.63	Outside Claim Representative	1,338	5,949	1,233	714	1,734	10,968
$22.59	Clerical	1,944	2,983	1,485	8,274	5,947	20,633
$39.91	Supervisor	5,385	3,175	4,883	14,518	9,086	37,048
$26.06	Claim Processor	1,550	115	3,716	4,119	2,781	12,281
	Total	17,440	14,308	16,586	49,641	26,793	124,768
	Number of Claims	996	518	948	1,176	667	4,305

Age Category: Outstanding > 90 Days

Avg. Hourly Cost	Position Name	Total Recorded Costs Office #1	Office #2	Office #3	Office #4	Office #5	Total
$29.95	Inside Claim Representative	22,043	4,721	21,339	57,766	29,109	134,978
$40.63	Outside Claim Representative	2,791	15,371	3,801	7,408	3,806	33,177
$22.59	Clerical	6,650	7,597	5,690	31,215	5,291	56,442
$39.91	Supervisor	26,436	19,293	36,477	39,063	7,477	128,747
$26.06	Claim Processor	3,069	274	11,816	9,753	4,730	29,641
	Total	60,990	47,255	79,123	145,203	50,413	382,985
	Number of Claims	4,600	3,284	6,747	8,996	5,489	29,116

EXHIBIT 4

SUMMARY OF HOURS IN CLAIM STUDY—ALL CLAIM TYPES

Office #1

Position Name	Available Monthly Hours	Recorded at Claim Level	Not Recorded at Claim Level: Customer Service	Non-Functional	Absence/ Vacation	Total Recorded
Inside Claim Representative	5,817	3,875	199	350	698	5,122
Outside Claim Representative	3,424	2,204	113	250	223	2,790
Clerical	11,709	3,389	405	470	735	4,999
Supervisor	4,425	3,129	154	541	491	4,315
Claim Processor	2,380	1,790	80	96	145	2,110
Total	27,755	14,387	951	1,707	2,292	19,336

Position Name	Recorded at Claim Level	Not Recorded at Claim Level: Customer Service	Non-Functional	Absence/ Vacation	Total Recorded
Inside Claim Representative	66.6%	3.4%	6.0%	12.0%	88.0%
Outside Claim Representative	64.4%	3.3%	7.3%	6.5%	81.5%
Clerical	28.9%	3.5%	4.0%	6.3%	42.7%
Supervisor	70.7%	3.5%	12.2%	11.1%	97.5%
Claim Processor	75.2%	3.4%	4.0%	6.1%	88.7%
Total	51.8%	3.4%	6.1%	8.3%	69.6%

Position Name	Percent of Total Time Recorded at Claim Level: Office #1	Office #2	Office #3	Office #4	Office #5
Inside Claim Representative	66.6%	64.6%	67.2%	68.2%	65.5%
Outside Claim Representative	64.4%	63.2%	65.6%	66.1%	63.9%
Clerical	28.9%	24.4%	18.6%	31.7%	31.2%
Supervisor	70.7%	69.1%	71.2%	71.9%	68.7%
Claim Processor	75.2%	74.3%	75.9%	76.1%	74.1%

EXHIBIT 5

SUMMARY OF GROSSED-UP COSTS

Age Category: Intake

Position Name	Total Costs Grossed Up for Unrecorded Time					
	Office #1	Office #2	Office #3	Office #4	Office #5	Total
Inside Claim Representative	17,428	6,895	11,273	34,407	15,885	85,887
Outside Claim Representative	4,683	15,665	4,250	2,388	3,156	30,142
Clerical	10,153	11,194	6,396	28,368	6,588	62,699
Supervisor	6,325	5,291	4,249	15,230	39,883	70,978
Claim Processor	4,229	247	8,027	5,866	5,430	23,799
Total	42,818	39,292	34,194	86,259	70,942	273,505
Number of Claims	585	304	654	650	452	2,645
Average Cost per Claim	$73.19	$129.25	$52.28	$132.71	$156.95	$103.40

Age Category: Outstanding 31–90 Days

Position Name	Total Costs Grossed Up for Unrecorded Time					
	Office #1	Office #2	Office #3	Office #4	Office #5	Total
Inside Claim Representative	10,845	3,228	7,842	32,281	11,061	65,256
Outside Claim Representative	2,078	9,413	1,879	1,079	2,714	17,164
Clerical	6,727	12,226	7,983	26,102	19,060	72,097
Supervisor	7,616	4,595	6,858	20,192	13,226	52,489
Claim Processor	2,062	155	4,895	5,412	3,753	16,278
Total	29,328	29,617	29,457	85,067	49,814	223,284
Number of Claims	996	518	948	1,176	667	4,305
Average Cost per Claim	$29.45	$57.18	$31.07	$72.34	$74.68	$51.87

Age Category: Outstanding > 90 Days

Position Name	Total Costs Grossed Up for Unrecorded Time					
	Office #1	Office #2	Office #3	Office #4	Office #5	Total
Inside Claim Representative	33,098	7,308	31,754	84,701	44,441	201,302
Outside Claim Representative	4,334	24,321	5,795	11,207	5,956	51,613
Clerical	23,012	31,134	30,592	98,469	16,957	200,163
Supervisor	37,392	27,920	51,232	54,329	10,884	181,758
Claim Processor	4,081	369	15,567	12,815	6,383	39,215
Total	101,917	91,052	134,941	261,520	84,622	674,052
Number of Claims	4,600	3,284	6,747	8,996	5,489	29,116
Average Cost per Claim	$22.16	$27.73	$20.00	$29.07	$15.42	$23.15

EXHIBIT 6

WORKERS COMPENSATION LOST-TIME CLAIMS DEVELOPMENT OF FINAL STANDARD COSTS

		Cost per Outstanding Claim	
	Intake	31–90 Days	> 90 Days
Claim Study Costs Excl. Field Office Overhead (from Exhibit 5)	$103.40	$51.87	$23.15
Field Office Overhead (from Exhibit 1)	1.555	1.555	1.555
Standards Including Field Overhead	$160.84	$80.67	$36.01
Home Office Overhead (from Exhibit 7)	1.383	1.383	1.383
Fully Loaded Standard Costs	$222.42	$111.56	$49.80

EXHIBIT 7

CALCULATION OF GENERAL OVERHEAD FACTOR

General Overhead Categories	$(000) Total Expense	% of Field Claim
Actuarial	1,835	1.0%
Claim Headquarters	8,922	5.1%
Commercial Lines Field	11,572	6.6%
Commercial Lines Home Office	512	0.3%
Controllers	6,789	3.9%
Corporate Finance	640	0.4%
Corporate Relations	175	0.1%
Executive	5,015	2.9%
General	20,557	11.8%
Government Affairs	0	0.0%
Human Resources	3,151	1.8%
Information Management	1,168	0.7%
Legal	3,319	1.9%
Operations	3,319	1.9%
Total Overhead	66,976	38.3%
Total Field Expenses (from Exhibit 1, Column (6) Total)	174,933	

EXHIBIT 8

PROJECTION OF ULTIMATE REPORT YEAR CLAIM COUNTS

Workers Comp.—Lost-Time

	Reported Number of Claims as of Elapsed Months										
Report Year	12	24	36	48	60	72	84	96	108	120	Ultimate Claims
1988	15,189	15,189	15,189	15,189	15,189	15,189	15,189	15,189	15,189	15,189	15,189
1989	17,426	17,426	17,426	17,426	17,426	17,426	17,426	17,426	17,426	17,426	17,426
1990	16,918	16,918	16,918	16,918	16,918	16,918	16,918	16,918	16,918	16,918	16,918
1991	16,923	16,923	16,923	16,923	16,923	16,923	16,923	16,923	16,923	16,923	16,923
1992	18,602	18,602	18,602	18,602	18,602	18,602	18,602	18,602	18,602	18,602	18,602
1993	17,001	17,001	17,001	17,001	17,001	17,001	17,001	17,001	17,001	17,001	17,001
1994	19,333	19,333	19,333	19,333	19,333	19,333	19,333	19,333	19,333	19,333	19,333
1995	17,693	17,693	17,693	17,693	17,693	17,693	17,693	17,693	17,693	17,693	17,693
1996	15,386	15,386	15,386	15,386	15,386	15,386	15,386	15,386	15,386	15,386	15,386
1997	15,025	15,025	15,025	15,025	15,025	15,025	15,025	15,025	15,025	15,025	15,025
	Development Factors										
1988	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
1989	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000			
1990	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000				
1991	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000					
1992	1.0000	1.0000	1.0000	1.0000	1.0000						
1993	1.0000	1.0000	1.0000	1.0000							
1994	1.0000	1.0000	1.0000								
1995	1.0000	1.0000									
1996	1.0000										
Avg.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
Wtd. Avg.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
3 Yr. Avg.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
3 Yr. Wtd. Avg.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
Selected	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
Cumulative	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
Percentage	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		

EXHIBIT 9

PROJECTION OF OUTSTANDING REPORT YEAR CLAIM COUNTS

Workers Comp.—Lost-Time

Report Year	Outstanding Number of Claims as of Elapsed Months										Ultimate Claims
	12	24	36	48	60	72	84	96	108	120	
1988	7,083	3,250	1,855	1,324	981	753	547	366	287	228	15,189
1989	8,196	3,632	2,283	1,507	1,104	770	576	391	303	262	17,426
1990	8,463	4,181	2,638	1,866	1,352	938	702	566	307	254	16,918
1991	8,803	4,367	2,848	1,925	1,229	793	560	451	307	254	16,923
1992	9,961	5,287	3,429	1,988	1,246	837	667	496	337	279	18,602
1993	9,408	4,239	2,414	1,421	953	835	610	453	308	255	17,001
1994	10,365	4,667	2,744	1,616	1,261	949	694	515	351	290	19,333
1995	8,879	4,136	2,312	1,616	1,154	869	635	472	321	266	17,693
1996	7,596	3,785	2,126	1,405	1,003	755	552	410	279	231	15,386
1997	8,107	3,612	2,076	1,372	980	738	539	401	273	226	15,025
	Portion of Ultimate Claims Outstanding										
1988	0.4663	0.2140	0.1221	0.0872	0.0646	0.0496	0.0360	0.0241	0.0189	0.0150	
1989	0.4703	0.2084	0.1310	0.0865	0.0634	0.0442	0.0331	0.0224	0.0174		
1990	0.5002	0.2471	0.1559	0.1103	0.0799	0.0554	0.0415	0.0335			
1991	0.5202	0.2581	0.1683	0.1138	0.0726	0.0469	0.0331				
1992	0.5355	0.2842	0.1843	0.1069	0.0670	0.0450					
1993	0.5534	0.2493	0.1420	0.0836	0.0561						
1994	0.5361	0.2414	0.1419	0.0836							
1995	0.5018	0.2338	0.1307								
1996	0.4937	0.2460									
1997	0.5396										
Avg.	0.5117	0.2425	0.1470	0.0960	0.0673	0.0482	0.0359	0.0267	0.0181	0.0150	
Wtd. Avg.	0.5125	0.2430	0.1476	0.0959	0.0673	0.0481	0.0359	0.0267	0.0181	0.0150	
3 Yr. Avg.	0.5117	0.2404	0.1382	0.0913	0.0652	0.0491	0.0359	0.0267	0.0181	0.0150	
Selected	0.5117	0.2404	0.1382	0.0913	0.0652	0.0491	0.0359	0.0267	0.0181	0.0150	

EXHIBIT 10

DETERMINATION OF CLAIM ADJUSTER EXPENSE RESERVE FOR OUTSTANDING CLAIMS

Workers Comp.—Lost-Time

	Average Outstanding Number of Claims								
Report Year	12–24 Mos	24–36 Mos	36–48 Mos	48–60 Mos	60–72 Mos	72–84 Mos	84–96 Mos	96–108 Mos	108–120 Mos
1988									
1989									282
1990								436	280
1991							506	379	281
1992						752	582	417	308
1993					894	722	532	381	282
1994				1,438	1,105	821	605	433	320
1995			1,964	1,385	1,011	752	553	396	293
1996		2,956	1,766	1,204	879	654	481	345	255
1997	5,859	2,844	1,724	1,176	859	638	470	337	249

Future Inflation Assumption 1.03

	Future Annual Claim Adjuster Expense per Outstanding Claim								
Report Year	12–24 Mos	24–36 Mos	36–48 Mos	48–60 Mos	60–72 Mos	72–84 Mos	84–96 Mos	96–108 Mos	108–120 Mos
1988									
1989									$210.12
1990								$210.12	$216.42
1991							$210.12	$216.42	$222.92
1992						$210.12	$216.42	$222.92	$229.60
1993					$395.93	$216.42	$222.92	$229.60	$236.49
1994				$615.53	$407.81	$222.92	$229.60	$236.49	$243.59
1995			$615.53	$633.99	$420.04	$229.60	$236.49	$243.59	$250.89
1996		$615.53	$633.99	$653.01	$432.65	$236.49	$243.59	$250.89	$258.42
1997	$631.43	$633.99	$653.01	$672.60	$445.62	$243.59	$250.89	$258.42	$266.17

EXHIBIT 10

(Continued)

Report Year	Future Claim Adjuster Expense for Outstanding Claims ($)									Claim Adjuster Reserve for Reported Claims
	12–24 Mos	24–36 Mos	36–48 Mos	48–60 Mos	60–72 Mos	72–84 Mos	84–96 Mos	96–108 Mos	108–120 Mos	
1988										0
1989									59,315	59,315
1990								91,709	60,693	152,402
1991							106,239	82,049	62,532	250,821
1992						158,056	125,896	92,896	70,798	447,646
1993					353,912	156,337	118,513	87,448	66,646	782,855
1994				885,407	450,659	183,115	138,812	102,426	78,062	1,838,480
1995			1,208,960	878,127	424,803	172,609	130,848	96,549	73,583	2,985,479
1996		1,819,297	1,119,570	786,537	380,495	154,605	117,200	86,479	65,908	4,530,091
1997	3,699,824	1,803,173	1,126,101	791,125	382,715	155,507	117,884	86,983	66,293	8,229,605
										19,276,694

EXHIBIT 11

CONVERSION OF MONTHLY STANDARDS TO ANNUAL COSTS

Average Cost per Outstanding Claim			
1–2 Months OS1	2–60 Months OS2	> 60 Months OS3	
$111.56	$49.80	$17.00	(from Exhibit 6)

Report Mo.	Development Month												
	13	14	15	16	17	18	19	20	21	22	23	24	Total
1	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
2	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
3	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
4	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
5	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
6	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
7	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
8	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
9	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
10	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
11	111.56	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
12	111.56	111.56	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
Total	721.12	659.36	597.60	597.60	597.60	597.60	597.60	597.60	597.60	597.60	597.60	597.60	7,356

Total Cost per Outstanding Claim in Months 12–24 of Report Year $613.04

= ((141 Mos.∗49.80) + (3 Mos.∗111.56))/12

= 613.04

EXHIBIT 11

(Continued)

Report Mo.	Development Month												Total
	61	62	63	64	65	66	67	68	69	70	71	72	
1	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	
2	49.80	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	
3	49.80	49.80	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	
4	49.80	49.80	49.80	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	
5	49.80	49.80	49.80	49.80	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	
6	49.80	49.80	49.80	49.80	49.80	17.00	17.00	17.00	17.00	17.00	17.00	17.00	
7	49.80	49.80	49.80	49.80	49.80	49.80	17.00	17.00	17.00	17.00	17.00	17.00	
8	49.80	49.80	49.80	49.80	49.80	49.80	49.80	17.00	17.00	17.00	17.00	17.00	
9	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	17.00	17.00	17.00	17.00	
10	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	17.00	17.00	17.00	
11	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	17.00	17.00	
12	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	17.00	
Total	564.80	532.00	499.20	466.40	433.60	400.80	368.00	335.20	302.40	269.60	236.80	204.00	4,613

Total Cost per Outstanding Claim in Months 60–72 of Report Year $384.40

= ((66 Mos.∗49.80) + (78 Mos.∗17.00))/12

= 384.40

EXHIBIT 12

DETERMINATION OF CLAIM ADJUSTER EXPENSE FOR IBNR CLAIMS

Workers Comp.—Lost-Time

	Expected Number of IBNR Claim as of Elapsed Months									Number of IBNR
Accident Year	24	36	48	60	72	84	96	108	120	Claims
1988										0
1989									0	0
1990								0	0	0
1991							0	0	0	0
1992						0	0	0	0	0
1993					0	0	0	0	0	0
1994				50	0	0	0	0	0	50
1995			296	0	0	0	0	0	0	296
1996		597	92	0	0	0	0	0	0	689
1997	584	218	34	0	0	0	0	0	0	836
										1,871

	Cost per IBNR Claim as of Elapsed Months								
Accident Year	24	36	48	60	72	84	96	108	120
1988									
1989									1,015
1990								1,015	1,045
1991							1,015	1,045	1,077
1992						1,015	1,045	1,077	1,109
1993					1,015	1,045	1,077	1,109	1,142
1994				1,015	1,045	1,077	1,109	1,142	1,177
1995			1,015	1,045	1,077	1,109	1,142	1,177	1,212
1996		1,015	1,045	1,077	1,109	1,142	1,177	1,212	1,248
1997	1,015	1,045	1,077	1,109	1,142	1,177	1,212	1,248	1,286

EXHIBIT 12

(Continued)

Accident Year	Total Cost of IBNR Claim as of Elapsed Months									Total IBNR Cost
	24	36	48	60	72	84	96	108	120	
1988										0
1989									0	0
1990								0	0	0
1991							0	0	0	0
1992						0	0	0	0	0
1993					0	0	0	0	0	0
1994				50,750	0	0	0	0	0	50,750
1995			300,440	0	0	0	0	0	0	300,440
1996		605,934	96,481	0	0	0	0	0	0	702,415
1997	592,958	228,082	36,317	0	0	0	0	0	0	857,357
										1,910,962

EXHIBIT 13

DETERMINATION OF ULTIMATE CLAIM ADJUSTER EXPENSE PER CLAIM

Report Year	(1) Ultimate Claims	(2) Total Cost	(3) Cost per Claim	(4) Trended Cost per Claim
1988	15,189	10,923,237	719	966
1989	17,426	12,893,052	740	965
1990	16,918	14,047,986	830	1,052
1991	16,923	14,652,296	866	1,065
1992	18,602	16,974,995	913	1,090
1993	17,001	15,015,915	883	1,024
1994	19,333	17,492,749	905	1,018
1995	17,693	16,192,833	915	1,000
1996	15,386	14,653,500	952	1,010
1997	15,025	14,903,259	992	1,022
		All Year Average		1,021
		Latest 3 Years		1,011
		Latest 5 Years		1,015
		Latest 5 Years Excl. High/Low		1,017
		Selected		1,015

(1) from Exhibit 8
(2) from Exhibit 16
(3) = (2)/(1)
(4) Costs in Column (3) are trended to 1998 levels using inflation factor of 3%

EXHIBIT 14

DETERMINATION OF CLAIM ADJUSTER EXPENSE COSTS FOR REPORTED CLAIMS

Workers Comp.—Lost-Time

Report Year	Average Number of Outstanding Claims								
	12–24 Mos	24–36 Mos	36–48 Mos	48–60 Mos	60–72 Mos	72–84 Mos	84–96 Mos	96–108 Mos	108–120 Mos
1988	5,167	2,553	1,590	1,153	867	650	457	327	258
1989	5,914	2,958	1,895	1,306	937	673	484	347	282
1990	6,322	3,410	2,252	1,609	1,145	820	634	436	280
1991	6,585	3,608	2,387	1,577	1,011	677	506	379	281
1992	7,624	4,358	2,709	1,617	1,042	752	582	417	308
1993	6,824	3,327	1,918	1,187	894	722	532	381	282
1994	7,516	3,706	2,180	1,438	1,105	821	605	433	320
1995	6,508	3,224	1,964	1,385	1,011	752	553	396	293
1996	5,691	2,956	1,766	1,204	879	654	481	345	255
1997	5,859	2,844	1,724	1,176	859	638	470	337	249

EXHIBIT 15

ANNUAL CLAIM ADJUSTER EXPENSE PER OUTSTANDING CLAIM

Workers Comp.—Lost-Time

	Future Inflation Assumption			1.03	Historical Inflation Assumption				1.03
Report Year	12–24 Mos	24–36 Mos	36–48 Mos	48–60 Mos	60–72 Mos	72–84 Mos	84–96 Mos	96–108 Mos	108–120 Mos
1988	483.94	485.90	500.48	515.50	341.53	186.69	192.29	198.06	204.00
1989	498.46	500.48	515.50	530.96	351.78	192.29	198.06	204.00	210.12
1990	513.41	515.50	530.96	546.89	362.33	198.06	204.00	210.12	216.42
1991	528.81	530.96	546.89	563.30	373.20	204.00	210.12	216.42	222.92
1992	544.68	546.89	563.30	580.19	384.40	210.12	216.42	222.92	229.60
1993	561.02	563.30	580.19	597.60	395.93	216.42	222.92	229.60	236.49
1994	577.85	580.19	597.60	615.53	407.81	222.92	229.60	236.49	243.59
1995	595.18	597.60	615.53	633.99	420.04	229.60	236.49	243.59	250.89
1996	613.04	615.53	633.99	653.01	432.65	236.49	243.59	250.89	258.42
1997	631.43	633.99	653.01	672.60	445.62	243.59	250.89	258.42	266.17

EXHIBIT 16

DETERMINATION OF TOTAL ADJUSTER EXPENSE FOR REPORTED CLAIMS

Workers Comp.—Lost-Time

Report Year	0–12 Mos	12–24 Mos	24–36 Mos	36–48 Mos	48–60 Mos	60–72 Mos	72–84 Mos	84–96 Mos	96–108 Mos	108–120 Mos	Total Cost
1988	5,170,639	2,500,273	1,240,269	795,514	594,108	296,110	121,348	87,780	64,666	52,530	10,923,237
1989	6,110,078	2,947,878	1,480,171	976,863	693,168	329,618	129,411	95,761	70,788	59,315	12,893,052
1990	6,109,936	3,245,787	1,757,580	1,195,722	879,944	414,872	162,408	129,336	91,709	60,693	14,047,986
1991	6,295,018	3,482,238	1,915,438	1,305,150	888,317	377,309	138,006	106,239	82,049	62,532	14,652,296
1992	7,127,170	4,152,626	2,383,341	1,525,685	938,174	400,353	158,056	125,896	92,896	70,798	16,974,995
1993	6,709,275	3,828,109	1,873,802	1,112,522	709,351	353,912	156,337	118,513	87,448	66,646	15,015,915
1994	7,858,478	4,343,113	2,149,910	1,302,768	885,407	450,659	183,115	138,812	102,426	78,062	17,492,749
1995	7,407,528	3,873,163	1,926,662	1,208,960	878,127	424,803	172,609	130,848	96,549	73,583	16,192,833
1996	6,634,905	3,488,504	1,819,297	1,119,570	786,537	380,495	154,605	117,200	86,479	65,908	14,653,500
1997	6,673,654	3,699,824	1,803,173	1,126,101	791,125	382,715	155,507	117,884	86,983	66,293	14,903,259

0–12 Months: from Exhibit 17

12–108 Months: Average Number of Outstanding Claims (Exhibit 14) × Annual Cost per Adjuster Expense per Outstanding Claim (Exhibit 15)

EXHIBIT 17

DETERMINATION OF ADJUSTER COSTS BETWEEN 12 AND 24 MONTHS

Workers Comp.—Lost-Time

Report Year	(1) Ultimate Claims	(2) 0–12 Month Cost per Reported Claim	(3) Total 0–12 Month Cost
1988	15,189	340.42	5,170,639
1989	17,426	350.63	6,110,078
1990	16,918	361.15	6,109,936
1991	16,923	371.98	6,295,018
1992	18,602	383.14	7,127,170
1993	17,001	394.64	6,709,275
1994	19,333	406.48	7,858,478
1995	17,693	418.67	7,407,528
1996	15,386	431.23	6,634,905
1997	15,025	444.17	6,673,654

(1) from Exhibit 8
(2) 1997 average cost from Exhibit 18; 1996 and prior costs are calculated by detrending 1997 cost using an inflation factor of 3%
(3) = (1) × (2)

EXHIBIT 18

Development of Claim Adjuster Cost per Claim for Months 0–12

Average Cost Per Intake Claim	Average Cost per Outstanding Claim			
	1–2 Months OS1	2–60 Months OS2	> 60 Months OS3	
$222.42	$111.56	$49.80	$17.00	(from Exhibit 6)

% of Claims Outstanding	1 73.2%	2 68.9%	3 64.6%	4 60.3%	5 56.0%	6 51.7%	7 47.4%	8 43.1%	9 38.8%	10 34.5%	11 30.2%	12 25.8%	
Report Mo.	Development Month												
	1	2	3	4	5	6	7	8	9	10	11	12	Total
1	222.42	76.90	72.09	30.04	27.89	25.75	23.60	21.45	19.31	17.16	15.02	12.87	
2		222.42	76.90	72.09	30.04	27.89	25.75	23.60	21.45	19.31	17.16	15.02	
3			222.42	76.90	72.09	30.04	27.89	25.75	23.60	21.45	19.31	17.16	
4				222.42	76.90	72.09	30.04	27.89	25.75	23.60	21.45	19.31	
5					222.42	76.90	72.09	30.04	27.89	25.75	23.60	21.45	
6						222.42	76.90	72.09	30.04	27.89	25.75	23.60	
7							222.42	76.90	72.09	30.04	27.89	25.75	
8								222.42	76.90	72.09	30.04	27.89	
9									222.42	76.90	72.09	30.04	
10										222.42	76.90	72.09	
11											222.42	76.90	
12												222.42	
Total	222.42	299.32	371.41	401.45	429.34	455.08	478.68	500.14	519.45	536.61	551.63	564.50	5,330
												Total Cost per Claim in Months 1–12 of Report Year (including Intake)	$444.17

EXHIBIT 19

DETERMINATION OF TOTAL CLAIM ADJUSTER RESERVE INCLUDING IBNR

(1) Reserve for IBNR Claims	(2) Reserve for Reported Claims	(3) Total Reserve
1,910,962	19,276,694	21,187,656

(1) from Exhibit 12
(2) from Exhibit 10
(3) = (1) + (2)