

## *ABSTRACT*

### **Using Claim Department Work Measurement Systems to Determine Claim Adjustment Expense Reserves**

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 ULAE reserves. The literature briefly mentions "transaction-based" methods that require claim department time studies. However, these methods are dismissed as too complex to perform. 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. Recent changes in the NAIC definition of loss adjustment expense are also discussed in the paper.

## **Introduction**

This paper will discuss 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 utilizes 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.

## **Definition of Loss Adjustment Expense**

Before discussing how to determine a reserve for claim adjuster expenses, it is first necessary to review recent 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 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 NAIC's Accounting Practices and Procedures (EX4) Task Force that a revised LAE definition be adopted.<sup>1</sup> 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 recently approved a Blanks Proposal to change the titles in 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;” the remaining expenses associated with adjusting and recording claims are assigned to “Adjusting & Other.”

Specifically, **Defense & Cost Containment (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;

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<sup>1</sup> Casualty Actuarial (Technical) Task Force, “Clarification of Revised ALAE Definition,” 6/24/97 Draft

- (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 Defense & Cost Containment 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 comprise 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.

### **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)
- 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 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<sup>2</sup> and Johnson<sup>3</sup>) have pointed out the shortcomings of the assumptions underlying this method. In particular, the use of a calendar year ratio will either understate or

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<sup>2</sup> Kittel, John, "Unallocated Loss Adjustment Reserves in an Inflationary Economic Environment," Casualty Actuarial Society Discussion Paper Program, Casualty Actuarial Society, Arlington, Virginia, May 1981, p. 311.

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.

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<sup>3</sup> Johnson, W. A., "Determination of Outstanding Liabilities for Unallocated Loss Adjustments Expenses," *PCAS* LXXVI, 1989, pp. 111-125.

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 notes:

One of the problems with unallocated loss adjustment expenses is that it is difficult to test one's assumptions about them because 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.<sup>4</sup>

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 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 various types of claims is to conduct a claim department work-study.

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<sup>4</sup> Johnson, p. 113-114.

However, all of these authors dismiss a time study as impractical. In the past, 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. Fortunately, today's modern technology offers a more efficient and accurate way of conducting such a study.

## **Overview of Claim Department Expense Study**

### **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 claims 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. The sum of all the transaction costs is then divided by the number of claims to determine the cost of handling a claim.



## **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 used for the claim study in this paper is 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 only utilized for Workers' Compensation, represents the work that is done on claims that are over 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 may 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 company writing commercial lines may wish to further distinguish between small commercial, middle market and large national account policies if it is felt that the cost 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 policies 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 settling 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 used in our study are shown in Exhibit 1.

- **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.

### **Steps in Performing a Claim Department Study**

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

1. Collect Duration of Claim Transactions by Claim Position
2. Determine Raw Costs by Multiplying Durations by Average Costs for Each Claim Position
3. Load Standards for Unrecorded Time
4. Divide Costs by Claim Volumes to Determine Average Cost
5. Load Standards for Other Field Office Claim Overhead Not Captured in the Work Study
6. 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: Collect Duration of Claim Transactions by Claim Position**

Exhibits 2 through 5 are each divided into three sections representing the three age categories in the study: intake, outstanding from 31-90 days, and outstanding from 90 days to 60 months.

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 the 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 a 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 2: 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.

Exhibit 1 shows the calculation of the average hourly cost. The hourly cost is based on 50 weeks per year at 36 ¼ hours per week for each staff position. For our study, we use countrywide average salary levels for each position, loaded for benefits and other expenses. 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 only be allocated 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. These positions accounted 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 3: 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. 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. The "Grossed-Up Costs" are displayed in 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 4: Determine Average Costs by Claim Category**

The calculation of the average 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. This standard represents the average cost that is incurred on a lost time claim in the first month that it is reported to the company. Similarly, the \$51.87 OS2 standard represents the average monthly cost of handling a claim that is between 30 and 90 days old.

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 was 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 that the office serves 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 5: 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 6: 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 overhead 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.

## **Practical Considerations in Conducting the Claim Study**

### **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 countrywide 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. These offices accounted 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.

## **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 a fewer number of workdays.

## **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.

## **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.

## **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 is 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.

### **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 claim financial and cost accounting, as well as two actuaries from claims actuarial. 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 corporate actuarial peer-reviewed the results of the study.

## **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.

## **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. However, simply increasing the standards by an arbitrary inflation factor will not recognize any productivity gains resulting from the claim department handling a higher 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 that was used to validate the standards described in the previous section. 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.

### **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 1-800 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.

### **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 claims representative. For this reason, the claim adjuster expenses associated with these claim files are considerably less. 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. The examples that follow use a selected cost of \$17 per month or \$204 per year.

### **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."<sup>5</sup> The methodology will be reviewed below using a simplified example. Modifications to the methodology will also be discussed.

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
- (iii) Calculate The Reserve by Multiplying the Number of Open Claims by the Outstanding Cost per Claim

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<sup>5</sup> Rahardjo, Kay Kellogg, "A Methodology for Pricing and Reserving for Claim Expenses in Workers Compensation"; *Casualty Actuarial Society Forum*, Casualty Actuarial Society, Arlington, Virginia, Summer 1996, pages 151-184.

## **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, a ten-year report year by development year triangle is used in this example. In a real application, it may be more appropriate to use quarterly development triangles and to expand the triangle beyond ten years.

The reader will observe that there is some development in report year counts beyond twelve months. This development results from the way our system identifies lost time claims. A claim may initially be reported to the company with no indemnity incurred on the claim. Our systems identify this claim as a medical only claim. If any indemnity is subsequently incurred, the claim is converted to a lost time claim, but retains the original date that the claim was reported to the company.

## **Projection of Outstanding Claim Counts**

Outstanding claim counts are displayed in the top portion of Exhibit 9. Rahardjo projects the number of outstanding claims at future development intervals by calculating the ratio of outstanding claims to ultimate claims at historical points. Ratios of outstanding claims to ultimate claims are selected for each development age. These averages are used to calculate the number of outstanding claims at future year-end development points.



## **Projection of Future Claim Adjuster Expense per Outstanding Claim**

The monthly standards developed in the claim study form the basis for the estimates of future claim adjuster expenses. The monthly standard must be converted into an annual cost. Since our standard varies with the age of the outstanding claim, the mix by age of claim must be considered. Exhibit 10 illustrates how the standards can be weighted to reflect the age of outstanding claims, assuming that claims are reported evenly throughout the year. Recall that the intake standard reflects the cost of the activity that takes place in the month in which the claim is reported. Since a claim incurs the intake cost in the month it is reported, it is not necessary to include this cost in the reserve for reported claims. The claim incurs the OS1 (30-90 day) cost for the next two months and then incurs the OS2 cost for months 4 through 60.

As the top section of Exhibit 10 shows, report year claims that are outstanding at the end of the first 12 months have incurred, on average, 21/12 months of OS1 costs and 45/12 months of OS2 costs. The total cost for the first year is \$381.98. Similarly, the second section of the exhibit shows that 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 second page of Exhibit 10 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. Of course, using quarterly

triangles rather than the annual triangles used in this example would improve the accuracy in estimating the age of open claims.

Inflation should be considered in developing future costs. For this example, we assume that future claim department costs will inflate at a rate of 3% per year. The inflated annualized standards are shown in the top section of Exhibit 11.

### **Calculation of Future Claim Adjuster Expenses**

The expected claim adjuster expense to be incurred in future years is the product of the average number of open claims times the inflation-adjusted standard. The average number of outstanding claims is calculated in the middle section of Exhibit 11 by taking the average of the number of claims at the beginning and end of each interval from Exhibit 9. More sophisticated assumptions about the claim closing patterns during the development period could be used.

### **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 future claim adjuster expenses. This calculation is illustrated in the bottom section of Exhibit 11.

For a long-tailed line, such as Workers' Compensation, it is necessary to include a provision for expenses incurred beyond ten years. Rahardjo describes a methodology for determining a tail for Workers' Compensation tabular claims which uses mortality assumptions. The tail reserve must include appropriate inflation assumptions.

## **Determination of Reserve for IBNR Claims**

The methodology discussed above only addresses the claim adjuster expense reserve for reported claims. Including only reported claims in the claim adjuster expense reserve may be appropriate when claim service is sold on an unbundled basis. In such cases, 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 most other circumstances, 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. For this reason, the claim adjuster expense reserve must include a provision for pure IBNR claims. Any standard method for calculating the number of pure IBNR claims could be utilized. The number of IBNR claims can then be multiplied by the average ultimate report year claim adjuster expense per claim to derive the claim adjuster expense reserve for IBNR claims. This method assumes that the cost of handling a late-reported claim is identical to the cost of handling a claim that is reported in the same year as the accident. More sophisticated assumptions could be used to reflect differences in the cost of handling IBNR claims.

The ultimate report year claim adjuster expense per claim is calculated in Exhibit 13 as the sum of the intake cost plus the total outstanding costs for each month that the claim is open. Total outstanding costs are determined by multiplying the average number of outstanding claims at each age by the outstanding standard. If past claim standards are available, the historical values can be used. Alternatively, the current standards can be detrended using an inflation assumption,

as shown in the top section of Exhibit 12. Finally, in Exhibit 14, the number of IBNR claims is multiplied by the ultimate report year claim adjuster expense per claim determined in Exhibit 13. The total claim adjuster expense reserve is the sum of the reserves for reported and IBNR claims. In determining the total Adjusting and Other reserve, a provision must be included for the other components that are not reflected in the claim expense study.

An additional consideration in determining the claim adjuster expense reserve is the treatment of canceled claims. In developing the claim standards, we recognized that a claim representative spends a considerable amount of time creating and investigating a claim that is later canceled. For this reason, a claim incurs the intake cost plus the outstanding cost for each month that it is open. Once the claim is canceled, no further costs are incurred. Accordingly, when determining the claim adjuster expense reserve, ultimate claims should be projected gross to canceled claims to determine the proper intake charges. The triangle of outstanding claims should reflect an outstanding count for each month the claim remains open.

### **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.

## **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. In fact, 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.

## **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.

### **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 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 for more details.<sup>6</sup>

### **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 triangle displayed in Exhibit 12. Of course, the triangle would need to be expanded to reflect projected future incurred 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. Another useful statistic is the average life of claim displayed at the bottom of Exhibit 9. The life of claim is calculated by multiplying the proportion of claims closing in an interval by the average number of months that the claim remained open. The proportion of claims closed is the difference between the claims open at the beginning and end of the interval. It should be noted that this example assumes that the 1.5% of claims remaining

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<sup>6</sup> Rahardjo, p. 164-167.

open at the end of ten years are open for another 6 months. As mentioned above, more sophisticated assumptions for the tail may be employed.

## **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

Johnson, W. A., "Determination of Outstanding Liabilities for Unallocated Loss Adjustments Expenses," *PCAS LXXVI*, 1989, pp. 111-125.

Kittel, John, "Unallocated Loss Adjustment Reserves in an Inflationary Economic Environment," *Casualty Actuarial Society Discussion Paper Program*, Casualty Actuarial Society, Arlington, Virginia, May 1981, Page 311.

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

Rahardjo, Kay Kellogg, "A Methodology for Pricing and Reserving for Claim Expenses in Workers Compensation"; *Casualty Actuarial Society Forum*, Casualty Actuarial Society, Arlington, Virginia, Summer 1996, pages 151-184.

## Total Countrywide Field Claim Expenses

\$(000)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Position	Staff	Salary & Benefits	Auto	Travel	Other	Total Field Expenses	Field Cost per Hour <sup>#</sup>
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
<b>Total Field</b>	<b>3,027</b>	<b>130,178</b>	<b>3,033</b>	<b>1,904</b>	<b>39,818</b>	<b>174,933</b>	
* Expenses Included in Study	2,138	80,166	1,930	1,109	29,263	112,467	
% of Expenses Included in Study	70.6%	61.6%				64.3%	
Field Overhead Factor (1/.643)						1.555	

# Based on 50 weeks at 36.25 hours per week

## Summary of Claim Transaction Durations

Age Category:		Intake				
Ave. Hourly		Number of Hours				
Cost	Position Name	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
	<b>Total Hours</b>	<b>825.8</b>	<b>612.0</b>	<b>683.8</b>	<b>1,666.1</b>	<b>1,329.0</b>
	<b>Number of Claims</b>	<b>585</b>	<b>304</b>	<b>654</b>	<b>650</b>	<b>452</b>

Age Category:		Outstanding 31-90 Days				
Ave. Hourly		Number of Hours				
Cost	Position Name	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
	<b>Total Hours</b>	<b>554.6</b>	<b>432.1</b>	<b>536.9</b>	<b>1,640.8</b>	<b>882.2</b>
	<b>Number of Claims</b>	<b>996</b>	<b>518</b>	<b>948</b>	<b>1,176</b>	<b>667</b>

Age Category:		Outstanding > 90 Days				
Ave. Hourly		Number of Hours				
Cost	Position Name	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
	<b>Total Hours</b>	<b>1,879.3</b>	<b>1,366.1</b>	<b>2,425.3</b>	<b>4,845.8</b>	<b>1,668.7</b>
	<b>Number of Claims</b>	<b>4,600</b>	<b>3,284</b>	<b>6,747</b>	<b>8,996</b>	<b>5,489</b>

## Development of Raw Recorded Costs

Age Category:		Intake					
Ave. Hourly		Total Recorded Costs					
Cost	Position Name	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
	<b>Total</b>	<b>25,209</b>	<b>20,925</b>	<b>20,670</b>	<b>49,451</b>	<b>45,900</b>	<b>162,156</b>
	<b>Number of Claims</b>	<b>585</b>	<b>304</b>	<b>654</b>	<b>650</b>	<b>452</b>	<b>2,645</b>

Age Category:		Outstanding 31-90 Days					
Ave. Hourly		Total Recorded Costs					
Cost	Position Name	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
	<b>Total</b>	<b>17,440</b>	<b>14,308</b>	<b>16,586</b>	<b>49,641</b>	<b>26,793</b>	<b>124,768</b>
	<b>Number of Claims</b>	<b>996</b>	<b>518</b>	<b>948</b>	<b>1,176</b>	<b>667</b>	<b>4,305</b>

Age Category:		Outstanding > 90 Days					
Ave. Hourly		Total Recorded Costs					
Cost	Position Name	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
	<b>Total</b>	<b>60,990</b>	<b>47,255</b>	<b>79,123</b>	<b>145,203</b>	<b>50,413</b>	<b>382,985</b>
	<b>Number of Claims</b>	<b>4,600</b>	<b>3,284</b>	<b>6,747</b>	<b>8,996</b>	<b>5,489</b>	<b>29,116</b>

Office #1	Summary of Hours in Claim Study					
Position Name	Available Monthly Hours	Recorded at Claim Level	Not Recorded at Claim Level			Total Recorded
			Customer Service	Non- Functional	Absence/ Vacation	
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
<b>Total</b>	<b>27,755</b>	<b>14,387</b>	<b>951</b>	<b>1,707</b>	<b>2,292</b>	<b>19,336</b>

  

Position Name	Recorded at Claim Level	Not Recorded at Claim Level			Total Recorded
		Customer Service	Non- Functional	Absence/ Vacation	
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%
<b>Total</b>	<b>51.8%</b>	<b>3.4%</b>	<b>6.1%</b>	<b>8.3%</b>	<b>69.6%</b>

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%

## Summary of Grossed-Up Costs

Age Category: Intake		Total Costs Grossed Up for Unrecorded Time					
Position Name	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	
<b>Total</b>	<b>42,818</b>	<b>39,292</b>	<b>34,194</b>	<b>86,259</b>	<b>70,942</b>	<b>273,505</b>	
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		Total Costs Grossed Up for Unrecorded Time					
Position Name	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	
<b>Total</b>	<b>29,328</b>	<b>29,617</b>	<b>29,457</b>	<b>85,067</b>	<b>49,814</b>	<b>223,284</b>	
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		Total Costs Grossed Up for Unrecorded Time					
Position Name	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	
<b>Total</b>	<b>101,917</b>	<b>91,052</b>	<b>134,941</b>	<b>261,520</b>	<b>84,622</b>	<b>674,052</b>	
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	

<b>Workers' Compensation Lost Time Claims Development of Final Standards</b>			
	<u>Intake</u>	<u>Outstanding Claims</u>	
		<u>31-90 Days</u>	<u>&gt; 90 Days</u>
<b>Claim Study Costs Excl. Field Office Overhead (From Exhibit 5)</b>	<b>\$103.40</b>	<b>\$51.87</b>	<b>\$23.15</b>
<b>Field Office Overhead (From Exhibit 1)</b>	<b>1.555</b>	<b>1.555</b>	<b>1.555</b>
<b>Standards Including Field Overhead</b>	<b>\$160.84</b>	<b>\$80.67</b>	<b>\$36.01</b>
<b>Home Office Overhead (From Exhibit 7)</b>	<b>1.383</b>	<b>1.383</b>	<b>1.383</b>
<b>Fully Loaded Standards</b>	<b>\$222.42</b>	<b>\$111.56</b>	<b>\$49.80</b>

### Calculation of General Overhead Factor

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



Projection of Ultimate Report Year  
Claim Counts

Workers' Comp. - Lost Time											
Report Year	Reported Number of Claims as of:										Ultimate Claims
	12	24	36	48	60	72	84	96	108	120	
1988	15,189	15,209	15,228	15,228	15,234	15,234	15,230	15,229	15,229	15,230	15,230
1989	17,426	17,478	17,491	17,495	17,500	17,500	17,499	17,497	17,498	17,499	17,499
1990	16,918	16,951	16,966	16,973	16,966	16,966	16,967	16,968	16,968	16,970	16,970
1991	16,923	16,982	16,997	16,998	17,003	17,006	17,007	17,006	17,007	17,008	17,008
1992	18,602	18,793	18,810	18,811	18,815	18,816	18,816	18,816	18,816	18,817	18,817
1993	17,001	17,161	17,178	17,190	17,193	17,194	17,195	17,194	17,194	17,196	17,196
1994	19,333	19,885	19,925	19,931	19,936	19,937	19,937	19,937	19,937	19,939	19,939
1995	17,693	18,350	18,370	18,376	18,381	18,382	18,382	18,382	18,382	18,383	18,383
1996	15,386	15,770	15,792	15,797	15,801	15,802	15,802	15,802	15,802	15,803	15,803
1997	15,025	15,479	15,500	15,506	15,509	15,510	15,511	15,510	15,510	15,511	15,511
Development Factors											
1988	1.0013	1.0012	1.0000	1.0004	1.0000	0.9997	0.9999	1.0000	1.0001		
1989	1.0030	1.0007	1.0002	1.0003	1.0000	0.9999	0.9999	1.0001			
1990	1.0020	1.0009	1.0004	0.9996	1.0000	1.0001	1.0001				
1991	1.0035	1.0009	1.0001	1.0003	1.0002	1.0001					
1992	1.0103	1.0009	1.0001	1.0002	1.0001						
1993	1.0094	1.0010	1.0007	1.0002							
1994	1.0286	1.0020	1.0003								
1995	1.0371	1.0011									
1996	1.0250										
Avg.	1.0133	1.0011	1.0003	1.0002	1.0000	0.9999	1.0000	1.0000	1.0001		
Wtd. Avg.	1.0136	1.0011	1.0003	1.0002	1.0000	1.0000	1.0000	1.0000	1.0001		
3 Yr. Avg.	1.0302	1.0014	1.0004	1.0002	1.0001	1.0000	1.0000	1.0000	1.0001		
3 Yr. Wtd. Avg.	1.0304	1.0014	1.0003	1.0002	1.0001	1.0000	1.0000	1.0000	1.0001		
Selected	1.0302	1.0014	1.0004	1.0002	1.0001	1.0000	1.0000	1.0000	1.0001		
Cumulative	1.0323	1.0020	1.0007	1.0003	1.0001	1.0000	1.0000	1.0000	1.0000		
Percentage	96.87%	99.80%	99.93%	99.97%	99.99%	100.00%	100.00%	100.00%	100.00%		

Projection of Outstanding Report Year Claim Counts

Workers' Comp. - Lost Time											
Report Year	Outstanding Number of Claims As of										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	15,230
1989	8,196	3,632	2,283	1,507	1,104	770	576	391	303	262	17,499
1990	8,463	4,181	2,638	1,866	1,352	938	702	566	307	254	16,970
1991	8,803	4,367	2,848	1,925	1,229	793	560	452	307	255	17,008
1992	9,961	5,287	3,429	1,988	1,246	837	672	500	340	282	18,817
1993	9,408	4,239	2,414	1,421	953	839	615	457	311	257	17,196
1994	10,365	4,667	2,744	1,616	1,289	973	713	530	360	298	19,939
1995	8,879	4,136	2,312	1,650	1,188	897	657	489	332	275	18,383
1996	7,596	3,785	2,127	1,419	1,021	771	565	420	286	237	15,803
1997	8,107	3,612	2,088	1,393	1,003	757	554	412	280	232	15,511
% of Ultimate Claims Outstanding											
1988	0.4651	0.2134	0.1218	0.0869	0.0644	0.0494	0.0359	0.0240	0.0188	0.0150	
1989	0.4684	0.2076	0.1305	0.0861	0.0631	0.0440	0.0329	0.0223	0.0173		
1990	0.4987	0.2464	0.1555	0.1100	0.0797	0.0553	0.0414	0.0334			
1991	0.5176	0.2568	0.1675	0.1132	0.0723	0.0466	0.0329				
1992	0.5294	0.2810	0.1822	0.1056	0.0662	0.0445					
1993	0.5471	0.2465	0.1404	0.0826	0.0554						
1994	0.5198	0.2341	0.1376	0.0810							
1995	0.4830	0.2250	0.1258								
1996	0.4807	0.2395									
1997	0.5226										
Avg.	0.5032	0.2389	0.1451	0.0951	0.0668	0.0480	0.0358	0.0266	0.0181	0.0150	
Wtd. Avg.	0.5040	0.2394	0.1455	0.0950	0.0668	0.0478	0.0358	0.0266	0.0180	0.0150	
3 Yr. Avg.	0.4954	0.2329	0.1346	0.0898	0.0646	0.0488	0.0357	0.0266	0.0181	0.0150	
Selected	0.4954	0.2329	0.1346	0.0898	0.0646	0.0488	0.0357	0.0266	0.0181	0.0150	

Calculation of Average Life of Claim											
Average Age	6	18	30	42	54	66	78	90	102	114	126
Cumulative % of Claims Closed	0.5046	0.7671	0.8654	0.9102	0.9354	0.9512	0.9643	0.9734	0.9819	0.9850	1.0000
Incremental Claims Closed	0.5046	0.2626	0.0983	0.0448	0.0251	0.0158	0.0131	0.0092	0.0085	0.0031	0.0150
Average Life of Claim = (.5046 * 6) + (.2626 * 18) + ... + (.0031 * 114) + (.015 * 126) = 19.9 Months											

Development of Annual Claim Adjuster Costs

INTAKE	OS1	OS2	OS3	
\$ 222.42	\$ 111.56	\$ 49.80	\$ 17.00	( From Exhibit 6)

Report	Development Month												Total
Mo.	1	2	3	4	5	6	7	8	9	10	11	12	
1	0.00	111.56	111.56	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
2		0.00	111.56	111.56	49.80	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
3			0.00	111.56	111.56	49.80	49.80	49.80	49.80	49.80	49.80	49.80	
4				0.00	111.56	111.56	49.80	49.80	49.80	49.80	49.80	49.80	
5					0.00	111.56	111.56	49.80	49.80	49.80	49.80	49.80	
6						0.00	111.56	111.56	49.80	49.80	49.80	49.80	
7							0.00	111.56	111.56	49.80	49.80	49.80	
8								0.00	111.56	111.56	49.80	49.80	
9									0.00	111.56	111.56	49.80	
10										0.00	111.56	111.56	
11											0.00	111.56	
12												0.00	
<b>Total</b>	<b>0.00</b>	<b>111.56</b>	<b>223.12</b>	<b>272.92</b>	<b>322.72</b>	<b>372.52</b>	<b>422.32</b>	<b>472.12</b>	<b>521.92</b>	<b>571.72</b>	<b>621.52</b>	<b>671.32</b>	<b>4,584</b>

**Total O/S Cost in Months 1-12 of Report Year** \$381.98  
 = ((45 Mos. \* OS2 + (21 Mos. \* OS1))/12  
 = ((45 Mos. \* 49.80) + (21 Mos. \* 111.56))/12

Report	Development Month												Total
Mo.	13	14	15	16	17	18	19	20	21	22	23	24	
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	
<b>Total</b>	<b>721.12</b>	<b>659.36</b>	<b>597.60</b>	<b>597.60</b>	<b>597.60</b>	<b>597.60</b>	<b>597.60</b>	<b>597.60</b>	<b>597.60</b>	<b>597.60</b>	<b>597.60</b>	<b>597.60</b>	<b>7,356</b>

**Total O/S Cost in Months 12-24 of Report Year** \$613.04  
 = (141 Mos. \* 49.80) + (3 Mos. \* 111.56)/12

Development of Annual Claim Adjuster Costs

Report	Development Month												Total	
	Mo.	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	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	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	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	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	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	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	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	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	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	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	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	17.00	17.00
<b>Total</b>	<b>564.80</b>	<b>532.00</b>	<b>499.20</b>	<b>466.40</b>	<b>433.60</b>	<b>400.80</b>	<b>368.00</b>	<b>335.20</b>	<b>302.40</b>	<b>269.60</b>	<b>236.80</b>	<b>204.00</b>	<b>4,613</b>	

Total O/S Cost in Months 60-72 of Report Year \$384.40  
 = ((66 Mos. \* 49.80) + (78 Mos. \* 17.00))/12



## Determination of Outstanding Claim Adjuster Expense Costs For Reported Claims

Workers' Comp. - Lost Time										
Future Inflation Assumption					Historical Inflation Assumption					
1.03					1.03					
ANNUAL CLAIM ADJUSTER EXPENSE PER OUTSTANDING CLAIM										
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
1988	292.76	483.94	485.90	500.48	515.50	341.53	186.69	192.29	198.06	204.00
1989	301.54	498.46	500.48	515.50	530.96	351.78	192.29	198.06	204.00	210.12
1990	310.58	513.41	515.50	530.96	546.89	362.33	198.06	204.00	210.12	216.42
1991	319.90	528.81	530.96	546.89	563.30	373.20	204.00	210.12	216.42	222.92
1992	329.50	544.68	546.89	563.30	580.19	384.40	210.12	216.42	222.92	229.60
1993	339.38	561.02	563.30	580.19	597.60	395.93	216.42	222.92	229.60	236.49
1994	349.57	577.85	580.19	597.60	615.53	407.81	222.92	229.60	236.49	243.59
1995	360.05	595.18	597.60	615.53	633.99	420.04	229.60	236.49	243.59	250.89
1996	370.85	613.04	615.53	633.99	653.01	432.65	236.49	243.59	250.89	258.42
1997	381.98	631.43	633.99	653.01	672.60	445.62	243.59	250.89	258.42	266.17

OUTSTANDING CLAIM ADJUSTER EXPENSE FOR REPORTED CLAIMS											Total
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	Outstanding
											Cost
1988	1,036,795	2,500,273	1,240,269	795,514	594,108	296,110	121,348	87,780	64,666	52,530	6,789,393
1989	1,235,705	2,947,878	1,480,171	976,863	693,168	329,618	129,411	95,761	70,788	59,356	8,018,720
1990	1,314,239	3,245,787	1,757,580	1,195,722	879,944	414,872	162,408	129,336	91,697	60,690	9,252,275
1991	1,408,050	3,482,238	1,915,438	1,305,150	888,317	377,309	138,006	106,322	82,188	62,652	9,765,669
1992	1,641,071	4,152,626	2,383,341	1,525,685	938,174	400,353	158,585	126,886	93,660	71,397	11,491,778
1993	1,596,464	3,828,109	1,873,802	1,112,522	709,351	354,762	157,291	119,428	88,155	67,201	9,907,086
1994	1,811,625	4,343,113	2,149,910	1,302,768	893,954	461,141	187,852	142,633	105,284	80,258	11,478,538
1995	1,598,454	3,873,163	1,926,662	1,219,491	899,822	437,928	178,397	135,454	99,984	76,219	10,445,573
1996	1,408,505	3,488,504	1,819,485	1,123,979	796,725	387,753	157,957	119,934	88,528	67,486	9,458,854
1997	1,548,356	3,699,843	1,806,757	1,136,333	805,482	392,015	159,693	121,252	89,501	68,228	9,827,460

### Determination of Ultimate Claim Adjuster Expense per Claim

Report Year	(1) Ultimate Claims	(2) Per Claim Intake Cost	(3) Total Intake Cost	(4) Total Outstanding Cost	(5) Total Cost	(6) Cost per Claim
1988	15,230	\$170.47	2,596,203	6,789,393	9,385,596	616
1989	17,499	\$175.58	3,072,508	8,018,720	11,091,227	634
1990	16,970	\$180.85	3,068,915	9,252,275	12,321,190	726
1991	17,008	\$186.27	3,168,120	9,765,669	12,933,789	760
1992	18,817	\$191.86	3,610,332	11,491,778	15,102,110	803
1993	17,196	\$197.62	3,398,146	9,907,086	13,305,232	774
1994	19,939	\$203.55	4,058,404	11,478,538	15,536,942	779
1995	18,383	\$209.65	3,854,118	10,445,573	14,299,691	778
1996	15,803	\$215.94	3,412,532	9,458,854	12,871,386	814
1997	15,511	\$222.42	3,450,042	9,827,460	13,277,502	856

(1) From Exhibit 9

(2) 1997 Intake Cost From Exhibit 6; 1996 and Prior are detrended by 3% per year

(3) = (1) x (2)

(4) From Exhibit 12

(5) = (3) + (4)

(6) = (5) ÷ (1)

<b>Determination of Total Claim Adjuster Reserve Including IBNR</b>					
	(1)	(2)	(3)	(4)	(5)
	Number	Cost	Reserve	Reserve for	Total
	of IBNR	per IBNR	for IBNR	Reported	Reserve
<u>Year</u>	<u>Claims</u>	<u>Claim</u>	<u>Claims</u>	<u>Claims</u>	<u>Reserve</u>
1988	0	616	0	52,530	52,530
1989	0	634	0	130,144	130,144
1990	0	726	0	281,723	281,723
1991	24	760	18,108	389,168	407,276
1992	132	803	105,655	850,880	956,536
1993	101	774	78,214	1,496,189	1,574,403
1994	126	779	98,200	3,173,890	3,272,090
1995	163	778	126,966	4,973,956	5,100,922
1996	272	814	221,741	8,050,349	8,272,090
1997	350	856	299,341	9,827,460	10,126,802
<b>Total</b>	<b>1,168</b>		<b>948,226</b>	<b>29,226,290</b>	<b>30,174,516</b>

(1) May be calculated using any method for determining IBNR claims

(2) From Exhibit 13

(3) = (1) x (2)

(4) From Exhibit 11

(5) = (3) + (4)