Two Alternative Methods for Calculating the Unallocated Loss Adjustment Expense Reserve

Donald F. Mango, FCAS, MAAA
Centre Solutions

and

Craig A. Allen, FCAS, FCIA
Lawyers' Professional Indemnity Company

Abstract

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More recently, Wendy A. Johnson proposed a method that compares paid calendar year claims department expenses to a weighted average of claim counts, and applies this ratio to the number of claims still to be settled.

This paper will explore the shortcomings of these two methods, and will offer two alternative methods which attempt to address some of these shortcomings. The first alternative method uses expected paid loss in place of actual paid loss as the projection base in the PTP method. The second is claim count based like the Johnson method, but reflects the changes in average ULAE costs per claim per calendar year, as the portfolio of claims is run off. The second method does so by projecting future calendar year claim staff levels and average ULAE per claim staff member.

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1. Introduction

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This paper will explore the shortcomings of these two methods, and will offer two alternative methods which attempt to address some of these shortcomings. The first alternative method uses expected paid loss in place of actual paid loss as the projection base in the PTP method. The second is claim count based like the Johnson method, but reflects the changes in average ULAE costs per claim per calendar year, as the portfolio of claims is run off. The second method does so by projecting future calendar year claim staff levels and average ULAE per claim staff member.

2. The Components of ULAE

The ULAE reserve is defined as the accrued liability, as of the valuation date, for those future claims costs that are not (and will not be) allocated to individual claim files. The liability provides both for claims reported as of the valuation date, and for IBNYR claims. These costs generally consist of the company's internal costs, including salaries for claims staff. The actuary should take care to include in the reserve the share of facilities overhead devoted to the claims handling function, including rent and utilities.

3. The Projection Base

John Kittel, in "Unallocated Loss Adjustment Expense Reserves in an Inflationary Economic Environment," notes that what he calls the "Transaction-Based Method" can be used to determine a very accurate reserve, but that this method requires a great deal of work. The Transaction-Based Method determines the ULAE reserve by estimating the future cost of each major Claim Department transaction (closing, single payment, new

claims, etc.), and estimating the number of such transactions needed to settle the portfolio of claims.
Rather than take on the laborious process of making projections for each category of claim transaction, PTP and the Johnson method consolidate transactions into a proxy that is used as a projection base. The respective projection bases are losses and claim counts.

The use of losses as a base of comparison has two major drawbacks, relative to the use of claims counts.

The first disadvantage is that the amount of ULAE does not depend solely on the magnitude of the accompanying dollars of loss. ULAE also depends on the average claim size underlying the dollars of loss. For example, the internal cost to settle a single million-dollar claim is probably less than the internal cost to settle a series of ten claims of $100,000 each. Yet, PTP fails to differentiate between these two situations, seeing only that the claims are worth $1 million. We will see in the next section of the paper where this property causes a problem.

The second problem with losses as a comparison base is that the ULAE reserve becomes a "rider" on the loss reserve, responding to whatever volatility is present in the estimates of ultimate incurred losses. In reality, major items in the ULAE reserve do not respond fully to fluctuations in loss amounts. For example, after a sudden drop in the number or value of claims, facilities overhead and the number of claim staff are unlikely to drop immediately.

4. Problems with the Paid-to-Paid Method

In addition to the weaknesses associated with using losses as a base of comparison, the following problems exist with respect to the PTP method.

4.1. *Upward Bias*

The methodology of PTP is biased and produces a larger ULAE reserve than is warranted.

PTP first divides calendar year paid ULAE by calendar year paid losses, in order to determine the rate at which ULAE is expended per dollar of loss. PTP then assumes that this rate will apply in the future, in settling the unpaid losses appearing on the balance sheet as of the valuation date.

For example, the ratio of calendar year payments could have determined that it cost on average, over the past year, $80 to settle $1,000 of claims, or 8% of losses. This is typical of a line like Commercial General Liability.

PTP will assume that the ultimate internal cost of settling those claims that remain open as of the valuation date will also be $80 per thousand dollars of claims. However, for most insurance companies, this assumption is too conservative, for two reasons:

1. For most insurance portfolios, the average size of claims remaining open at the valuation date is greater than the average size of claims opened and claims closed over the prior calendar year. This is the case even where there is no inflation and no growth in the exposure base.

2. The cost of ULAE per thousand dollars of claims is a decreasing function of the average claim size.

If the claims handled over the prior calendar year cost $80 of ULAE per thousand, then the claims remaining open at the valuation date, being larger, should cost less than $80 of ULAE per thousand.

The following two subsections will elaborate on these reasons.

4.1.1. *The Average Size of Open Claims is Greater than the Average Size of Claims Handled in the Previous Calendar Year*

That the average size of claims open at the valuation date is greater than the average size of claims handled over the prior calendar year is a consequence of the fact that:

- claims that take more time to close are larger, on average, than those that are closed more quickly; and
- small claims that close more quickly are less likely to appear on the balance sheet as unpaid claims.

Claims handled by an insurer's claims department over a calendar year can be grouped into the following four quadrants, shown in Table 1:

Table 1
Calendar Year Claim Quadrants

	Reported During Year	Open at Beginning of Year
Closed During Year	I	II
Open at End of Year	III	IV

Assume (following the "50/50 Rule" – see Section 4.3 below) 50% of claim department activity occurs at the time a claim opens, and 50% when it is closed. The claim department's calendar year would be focused on Quadrants I, II and III only. Quadrant IV

claims, being open at the beginning and end of the year, would not generate any calendar year activity.

Quadrants III and IV comprise the claims remaining open at the end of the calendar year. Quadrants II and IV represent claims open at the end of the prior calendar year. Note that Quadrant I is the only quadrant that is not represented at the end of any calendar year.

Since Quadrant I consists of those claims that are closed in the same year they are reported, claims in this quadrant close more quickly than those in any other quadrant. Since claims that close quickly tend to be smaller than those that close more slowly, Quadrant I should have the smallest average claim size among the quadrants.
By contrast, Quadrant IV is made up of claims open in the prior calendar year, open in the current calendar year, and open into at least the next calendar year. This quadrant is the only one where all claims remain open in parts of at least three calendar years. Since larger claims tend to remain open longer, Quadrant IV should have the largest average claim size among the quadrants.

Since claims handled over a calendar year exclude the quadrant with the largest average claim size (Quadrant IV), while claims open at the end of the calendar year exclude the quadrant with the smallest average claim size (Quadrant I), the former has a smaller average size than the latter.

The following example will illustrate this point.

Company XYZ receives 30,000 Commercial General Liability claims per year, closed over a six-year period. The average claim size is $40,000. Table 2 shows the rate at which claims are closed and their average size.

Table 2
Sample Report Year Claim Closing Pattern

Claims Reported in One Year							
	Year Claims Closed						
	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	Total
Count Closed	10,000	5,000	5,000	5,000	2,500	2,500	30,000
Average Size	$2,500	$10,000	$25,000	$75,000	$100,000	$150,000	$40,000

Assume the following:

- There is no change in the exposure base and no severity trend.
- The same number of claims, at the same average size, are reported each year.

- We begin with report year 2000 in calendar year 2000 and move forward adding additional report years.

Exhibits 1 and 2 will track the progress of two claim populations: claims closing in a given calendar year (Exhibit 1) and claims open as of the end of a given calendar year (Exhibit 2).

Column (4) of Exhibit 1 demonstrates that a plateau of 30,000 closed claims per calendar year is reached, beginning in 2005. Meanwhile, Exhibit 2 shows that the number of open claims reaches a steady state of 52,500 claims, beginning at the end of 2004. Thus, in calendar year 2005, Company XYZ's claims department will open 30,000 claims, close 30,000 claims, and will be managing a portfolio of 52,500 open claims as of December 31, 2005.

The PTP method will determine a ratio of $80 per thousand of loss by measuring XYZ's claims expenditures in opening 30,000 claims and closing 30,000 claims over the course of 2005. The ratio will be applied to the claims reserve underlying the 52,500 claims open at December 31, 2005.

Column (6) of Exhibit 1 shows that the average size of the 30,000 claims closed in 2005 will be $40,000. Based on Table 2 above, the 30,000 claims reported in 2005 will also have an average size of $40,000. Assuming that all claim department activity takes place when a claim is either opened or closed, the average claim size underlying claim department activity in calendar year 2005 will thus be $40,000.

In contrast, Column (6) of Exhibit 2 shows that the average size of the 52,500 claims open as of December 31, 2005 will be $81,905. Thus, the example illustrates that the average size of open claims at the valuation date will be greater than the average size of claims either opened or closed in the prior calendar year.

Significantly, this example shows this inequality to be true even where there is no growth in the exposure base and no inflation.

We can further illustrate this example in terms of the four quadrants. Columns (8) and (9) of Exhibits 1 and 2 show the number of claims and the average claim size by quadrant. This is reproduced in Table 3. Table 3 also shows the portion of claim department activity within the calendar year and in subsequent calendar years, by quadrant:

Table 3
Values by Quadrant for the Example

(1) Quadrant	(2) Number of Claims	(3) Average Size	(4) Portion of Claim Dept. Activity in Calendar Year	(5) Portion of Claim Dept. Activity in Subsequent Calendar Years
I	10,000	$2,500	100%	0%
II	20,000	$58,750	50%	0%
III	20,000	$58,750	50%	50%
IV	32,500	$96,154	0%	50%

As expected, the 10,000 claims in Quadrant I have the lowest average size, $2,500, while the 32,500 claims in Quadrant IV have the greatest average size, $96,154.

The average claim size handled over the course of 2005 can be determined by taking a weighted average of the claim size by quadrant (Column (3)). The weighting to be used is the product of the number of claims (Column (2)) and the proportion of claims department activity within the calendar year (Column (4)). Once again, the average claim size handled over 2005 is determined to be $40,000.

This average gives no weight to the largest claims, the 32,500 claims from Quadrant IV with an average size of $96,154. It also gives only half weight to the claims from Quadrants II and III, while giving full weight to the smallest claims, those from Quadrant I.

For comparison, the average claim size open at December 31, 2005 is taken by replacing Column (4) in the weighted average with Column (5). The result, as before, is an average of $81,905.

This average gives no weight to Quadrant I, the smallest claims, while it gives weight to the large claims appearing in Quadrant IV. It is therefore not surprising that the open claims at the end of 2005 are larger than the average claims handled over the course of 2005.

Note that, in this steady-state situation, the average size of claims handled, $40,000, equals the average size of claims reported each year. This equality makes intuitive sense, since the entire population of reported claims must pass before the claims department in at least one calendar year. Even those claims in Quadrant IV, which are left out of the calculation of the average for the current calendar year, did appear in the calculation for a

prior calendar year (in that calendar year's Quadrant III), and will be present in the calculation for a later calendar year (in the later calendar year's Quadrant II).

Intuitively, it might seem that the average open claim size would also be $40,000. After all, every claim reported must remain open for at least some interval. According to this line of reasoning, the open claims at the valuation date, like the claims handled over a calendar year, would reflect the entire population of reported claims. However, the example and the paradigm of the four quadrants illustrate that the opposite is true. Since the valuation of claims liabilities is performed at discrete intervals, the segment of claims remaining open at the valuation date is not representative of the complete population of reported claims (i.e. it excludes Quadrants I and II claims).

4.1.2 *ULAE per Thousand Dollars of Claims is a Decreasing Function of Average Claim Size*

As mentioned in Section 3, the assumption of a fixed ULAE cost per thousand dollars of claims is not valid, when comparing claims of different sizes. It is unlikely that the ULAE associated with settling a million-dollar claim would be 100 times that for a $10,000 claim.

The ratio of ULAE to claims cost probably decreases non-linearly with claim size, ranging from infinite for those claims closed without payment, to something much less than $80 for those claims at policy limits.

4.2. *Inflation*

As pointed out by John Kittel, the paid-to-paid ratio is distorted in an upward direction under inflationary conditions. This distortion arises because the impact of inflation on the denominator of the ratio lags its impact on the numerator. This lag is due to the fact that most of the losses paid in a calendar year were incurred in a prior year, and thus are largely unaffected by the most recent inflation.

4.3. *50/50 Rule*

The ratio of paid ULAE expenses to paid losses represents the cost of disposing of a claim file over its lifetime, from the time it is reported until it is closed. However, a portion of the ULAE reserve provides for claims that have already been reported to the insurer. For these claims, no liability remains for the cost of opening the file.

To account for this, the paid-to-paid ratio is multiplied by a factor representing the proportion of ULAE paid at the closing of claim files. The customary ratio used is 50%. However, depending on the nature of the claims, the proportion of expenses incurred on

closing could differ from 50%. The PTP method requires that the actuary determine what proportion is appropriate.

Furthermore, in an inflationary environment, one encounters the problems illustrated by Richard Bill, in his review of Kittel. Bill points out that inflation increases the share of ULAE paid at closing, thus shifting the balance from (50% at opening, 50% at closing) to, perhaps, (40% at opening, 60% at closing).

4.4. *Unresponsiveness*

As also pointed out in Bill's review of Kittel, the paid-to-paid ratio can be unresponsive to growth in exposure. The numerator in the ratio tends to react quickly to an increase in exposure, as an increase in the number of claims being opened, and an increase in the ULAE paid in a calendar year follows relatively rapidly. The denominator, on the other hand, reflects claims payments made on claims that were incurred at the former, lower, exposure base.

Kittel recommends correcting for this distortion by replacing the denominator of the paid-to-paid ratio by

0.5 x (calendar year paid losses + calendar year incurred losses)

4.5 *Steady-State Ratio Applied to Runoff Reserve*

The paid-to-paid ratio is usually taken in a steady-state situation. The runoff situation differs from the steady-state situation in two respects:

- As the number of open claims dwindles, the larger, more difficult claims tend to remain. The more experienced, skilled claims staff are retained to handle these claims, pushing up average salaries.
- The share of ULAE made up of facilities costs increases, as overhead cannot be reduced as easily as can the variable costs associated with employing a number of claims staff.

5. Issues with the Johnson Method

There has been no commentary in the CAS literature addressing the Johnson Method since it was published a decade ago. We wish to spark more discussion of the method, by sharing some of the issues we have addressed in the course of its implementation.

5.1 *Divergence from PTP*

Empirically, the Johnson method produces much lower estimates than does PTP. This divergence calls into question the accuracy of both methods.

5.2 *Overlap of Claim Categories*

The Johnson method recommends claims be grouped into the following categories: opened in the calendar year, closed in the calendar year, open during the entire calendar year, and both opened and closed during the calendar year. These four categories are not disjoint (e.g. a claim opened and closed during the year would fall into both the "opened" and "both opened and closed" category). No study has been published in the CAS literature which explores whether the predictive power of the method is improved by the addition of the "both opened and closed" category.

5.3 *Assumption Regarding Open Claims*

The Johnson method assumes between the opening and the closing of a claim, that the unallocated costs of handling that claim are directly proportional to the number of years the claim stays open. Thus, a claim that stays open ten years will cost twice as much, between opening and closing as a claim that stays open five years.

In fact, claims that stay open longer may do so because of a lull in claim activity brought on by external circumstances (e.g. a trial). Such a lull will reduce the time spent on the file by claim staff, for the duration of the lull. For these claims, a modification of the 50/50 rule, of the following type, may be more appropriate, as shown in Table 4:

Table 4
Alternative Weighting of ULAE Over Life of Claim

Stage of Claim	Percentage of Total ULAE
Opening	40%
Mid-Life	25%
Closing	35%

5.4 *Typical Reserving Data*

Typical reserving data might include triangles of reported and closed claim counts, from which projections of ultimate claim counts by accident year can be made. Reporting and closing patterns can also be estimated. From these common components, projections of

future calendar year counts that were opened, closed, and open during the year could be easily made. However, estimating the number of claims that both opened and closed in future calendar years would be difficult. This projection would probably require a special query of claim data at the individual claim level.

5.5 *Average Cost per Claim*

As with the PTP approach, the Johnson method relies on ULAE amounts paid while the claims department operates in a steady state. The cost per claim file, in fact, can be expected to increase during the runoff, as more experienced claims staff are retained, and as facilities costs represent an increasing share of the ULAE incurred.

This increase in the average cost of handling a file can easily be recognized, through the trend that Johnson applies.

5.6 *Weighting Process*

The Johnson method implicitly assumes that a claim file incurs twice the ULAE cost in the year it is opened, as in any subsequent period. This assumption may or may not be accurate. Thus, a drawback of the Johnson method is the need to verify the accuracy of this assumption. If more refinement of the weighting process is sought, interviews with claims staff will need to be conducted and estimates of time allocations made.

6. Expected Paid to Paid Method

The first alternative method overcomes some of the weaknesses of the PTP method by replacing actual paid loss dollars with expected paid loss dollars.

For long-tailed lines of business and/or situations with changing premium volume, the traditional PTP method is slow to respond. Being subject to the random fluctuations in actual paid amounts, the series of PTP ratios can also fail to reflect trends in claim cost management. For purposes of selecting budgeted ULAE loads these trends can be important. Using expected paid loss as the base instead of actual paid loss can reflect these trends more quickly and effectively.

Exhibit 3 shows an example of how this might work for Company XYZ's Commercial General Liability book. Column 9 shows the PTP ratios for calendar years 1991-1995 using actual paid loss as the base. The ratios show an erratic pattern over the five-year period, during which overall ULAE costs (Column 8) actually came down, while accident year ultimate loss amounts increased. This series of ratios would not provide strong support for the selection of a lower PTP ratio. Yet the claim department could rightly

argue that ULAE costs have decreased while loss volume (represented here by AY ultimate losses) has increased. Why, they may ask, is this efficiency gain not showing up in the actual PTP ratios?

The PTP ratios using expected paid losses would show the efficiency gain. If the payment patterns and ultimate losses are accurate, it is reasonable to assume the five-year expected paid loss will be close to actual paid. The top portion of Exhibit 3 calculates the expected paid loss for calendar years 1991-1995. Column 10 shows the resulting PTP ratios based on expected paid. A clear decreasing trend is visible, giving strong support to the selection of a lower ULAE load.

7. The Claim Staffing Method

The second alternative method attempts to address some of the shortcomings of the Johnson method. It is closer to what Kittel called a "transaction-based method." It uses a new projection base – the sum of calendar year Opened, Closed and Pending claims ("OCP Claims") – and future claim staff workload levels to project future ULAE payments.

What are the practical characteristics of OCP Claims as a base for ULAE that make it so appealing?

1. *It is a reasonable proxy for claims department activity.*
   It is arguably directly proportional to levels of claim activity, especially number of staff and workload levels of the staff.
2. *It is claim count based.*
   As mentioned above, paid loss is not a particularly effective or responsive base for projecting ULAE. Claim counts (if case complexity issues are addressed) bear a more direct relationship to claim staff activity.
3. *It is derivable from typical reserve study information.*
   Projected Opened, Closed and Pending claims are derivable from ultimate claim counts, a claim reporting pattern and a claim closing pattern.

The method projects four components:

1. Future Calendar Year OCP Claims;
2. Future Calendar Year claim staff workloads (expressed as OCP Claims per staff member);
3. Future Calendar Year claim staff count; and
4. Future Calendar Year ULAE per claim staff member.

Future Calendar Year ULAE payments equal the product of future claim staff count and future ULAE per claim staff member. The ULAE Reserve is the sum of future Calendar Year ULAE payments.

7.1. *Detailed Description*

The following provides more detailed descriptions of the components needed and steps required to calculate the ULAE reserve. Assume the valuation date is 12/31/1998.

Import elements are noted in **boldface**.

A. *Preliminary Values (Based on actual data)*

1. Claims staff count for CY 1998
2. Total OCP Claims for CY 1998
3. **CY 1998 Workload** = A2 / A1
4. Total Paid ULAE for CY 1998
5. **CY 1998 Average Paid ULAE per Staff** = A4 / A1

B. *Projected Future CY OCP Claims*

1. Cumulative Claim Reporting Pattern
2. Cumulative Claim Closing Pattern
3. Projected Ultimate AY Claim Counts as of 12/1998
4. **Projected Future CY Opened Claims** = Difference in Cumulative Open Claims [(B3) Ultimate Claim Counts x (B1) Cumulative Claim Reporting Pattern] between each year-end and prior year-end.
5. **Projected Future CY Closed Claims** = Difference in Cumulative Closed Claims [(B3) Ultimate Claim Counts x (B2) Cumulative Claim Closing Pattern] between each year-end and prior year-end.
6. **Projected Future CY Pending Claims** = Average of Open Claims at each year-end and prior year-end.
7. **Projected Future CY OCP Claims**[1] = Sum of [(B4), (B5), (B6)]

[1] The issue of addressing the impact of re-opened claims may be necessary for some companies. The effect depends in part on a company's treatment of re-opened counts in reported/open counts. If they are included in reported (i.e. re-opening = a reversal of status from "closed" back to "open" vs. a change to a separate status "re-opened"), then the reporting pattern should capture them already. If they are not included in reported counts, it may not be worth much effort including them unless they constitute a meaningful portion of the total claim activity for the line of business.

The claim staffing method uses OCP claims as a proxy for claims department activity, claim complexity and staffing needs. If re-opened claims are not a meaningful part of total claims activity, OCP claims may have suitable explanatory power for reserving purposes. Including re-opened claims may not improve the

C. *Projected Future CY Workload*

1. **Workload decrease rate** = rate at which workload decreases towards runoff level; Reflects increasing case complexity as runoff progresses.
   See Section 8 below for a more complete discussion of this variable and its derivation.
2. **Minimum workload** = steady-state runoff workload level.
   See Section 8 below for a more complete discussion of this variable and its derivation.
3. **Projected Future CY Workload** = Max of [Prior CY Workload x (C1) Workload decrease rate, (C2) Minimum workload]

D. *Projected Future CY Average Paid ULAE Per Staff*

1. **Annual Trend** = year-over-year change in Average ULAE.
   Can vary by future CY.
2. **Projected Future CY Average Paid ULAE Per Claim Staff Member =** Prior CY ULAE x (D1) Annual Trend[2].
   See Section 8 below for a more complete discussion of this variable and its derivation.

E. *Projected Future Claims Staff Count*

= **Projected Future CY OCP Claims** (B7) / **Projected Future CY Workload** (C3)

F. *Projected Future Paid ULAE*

= **Projected Future Claims Staff Count** (E) x **Projected Future CY Average Paid ULAE Per Staff** (D3)

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predictive power enough to justify the increased complexity and cost.

If re-opened claims are meaningful, the claim staffing method can easily be extended to "OCPR" claims, by using current CY Opened, Closed, Pending and Re-opened. This would require a separate re-opening pattern expressed as a percentage of ultimate counts.

[2] It is important to reflect the increasing percentage of total ULAE due to fixed costs (facilities, rent, overhead, etc.) as the claim staff gets smaller. This could be handled by either explicitly modeling the future CY ULAE as the sum of a fixed and variable component, or by judgmentally increasing the future CY trends.

8. Further Discussion of Unique Inputs

In this section, three of the inputs unique to the claim staffing method will be discussed further: workload decrease rate, minimum workload, and trend in average ULAE.

8.1. *Workload Decrease Rate*

This is a calendar year figure that represents the shift in claim complexity as the runoff of the line progresses. It is definitely LOB-specific and largely company-independent.

During the most recent calendar year (i.e. CY 1998 for a reserve as of 12/31/1998) the claims department is handling a "steady-state" population of claims, including many small claims from the current accident year (e.g. AY 1998).

However, the ULAE reserve is meant to cover claims handling costs for claims on occurrences up to the reserving date. If for example, the company is in runoff in CY 1999, they will only be handling claims for AYs 1998 and prior, a population of claims without any new, small, easy-to-settle claims. For each subsequent CY (e.g. 2000, 2001), the CY population will be shifting towards a more complex, higher-value, more difficult-to-settle profile. This increased complexity is reflected in the method by **decreasing the average workload** (expressed as the number of OCP claims) **of a claim adjuster**. It is assumed that, at some point in the future, the workload rate will hit some minimum, representing what we might call "pure runoff."

The workload decrease rate determines how quickly the CY workload changes from its steady-state value to its pure runoff value.

One might estimate the workload decrease rate in a number of different ways. One approach involves selecting the minimum workload and a date when pure runoff is assumed to begin. Pure runoff may be assumed to begin when the most recent accident year's percentage of ultimate counts reported reaches some threshold, e.g. 95%. The workload could follow many different transition paths from steady-state level to pure runoff workload. Table 5 below shows an example of two transition approaches: straight-line and constant-rate.

Table 5
Examples of Workload Decrease Rate Calculations

Calendar Year	Straight-Line		Constant-Rate	
	Workload	Decrease Rate	Workload	**Decrease Rate**
0 = Current	**500**	-	500	**-**
1	**450**	90.0%	409	**81.8%**
2	**400**	88.9%	334	**81.8%**
3	**350**	87.5%	273	**81.8%**
4	**300**	85.7%	224	**81.8%**
5	**250**	83.3%	183	**81.8%**
6	**200**	80.0%	150	**81.8%**
7	**150**	75.0%	122	**81.8%**
8 = Pure Runoff begins	**100**	66.7%	100	**81.8%**

In the straight-line approach, it is assumed that the incremental drop in workload is constant year to year. In the example, the difference between the current workload of 500 and the pure runoff workload of 100 is 400, which must be "amortized" over 8 years, implying an annual difference of 50.

In the constant rate approach, the year-over-year ratio is assumed constant. To transition from 500 to 100 over 8 years would require multiplying 500 by the rate *r* 8 times. This suggests

$$100 = 500r^8$$
$$r = (100/500)^{1/8} = \mathbf{81.8\%} \qquad [8.1]$$

8.2. *Minimum Workload*
As mentioned in the previous section, the minimum workload represents the pure run-off workload of experienced claims personnel such as those that might be maintaining and running off such a book of difficult, long-tailed cases. This figure is line specific and probably company specific as well. It is best parameterized through discussions with the claims department.

8.3. *Trend in Average ULAE*
This parameter combines the impact of several factors:

1. Economic inflation;

2. Upward "Salary drift" due to increased average claims staff member experience level; and
3. Increase in the proportion of ULAE attributable to fixed costs.

First, pure economic inflation in average salary and cost levels must be reflected.

Second, as a runoff progresses, the distribution of claim department experience levels (and hence salaries) shifts from its steady-state level. Through attrition, layoffs, and the lack of new hires, only the most seasoned and experienced claims staff members will remain to manage the pure runoff phase. This group's greater experience will mean a higher average salary level (after adjusting for inflation) than the steady state average salary. This "drift" in salary must be accounted for in the trend.

Finally, as the runoff progresses and the number of staff members drops significantly, the proportion of overall staff costs related to allocation of fixed facility costs increases compared to the steady state allocations.

Because of its complexity, the trend in average ULAE is a difficult parameter to estimate. The authors cannot offer anything beyond judgment and interviews with experienced claim personnel.

Perhaps, if this method gains some measure of acceptance in the reserving community, specific methods for estimating the parameters will be developed by other practitioners. The component factors seem accessible to actuarial analysis.

9. Example of the Claim Staffing Method

Exhibits 4 and 5 show a detailed example applying the Claim Staffing Method.

9.1. *Exhibit 4:*

Preliminary Values:

Item	*Value*
A1. Claims Staff Count for CY 1998	150
A2. Total OCP Claims for CY 1998	34,998
A3. Workload = A2 / A1	233
A4. Total Paid ULAE for CY 1998	$8,500,000
A5. Average Paid ULAE per Staff = A4 / A1	$56,667

Other Input Values[3]*:*

- C1 Workload Decrease Rate = 80%.
  For example, the CY 1999 workload would equal 80% of the CY 1998 workload, to reflect the increasing complexity of the case load as the runoff progresses, subject to a minimum.
- C2 Minimum Workload = 50 claims per staff member
  This is the workload during pure runoff.

ULAE Reserve Calculation:

(1) Calendar Year – includes CY 1998, which is the basis for the projection period.
(2) OCP Claims – from Exhibit 5 (see below).
(3) Workload – using CY 1998 as a base value, each subsequent year = Max [Prior Year x C1, C2]
(4) Implied Staff Count = (2) / (3)
(5) Implied Staff Count = (2) / (3)
(6) Trend in Average ULAE – input number over the life of the runoff.
(7) Average ULAE per Staff = prior CY value x [1.0 + (5)]
(8) Projected ULAE = (4) x (6)
(9) Total Reserve = Sum from 1999 to 2006 of (7)
The runoff is assumed to be complete as of 2006.

9.2. *Exhibit 5 - Projected Future CY OCP Claims*

Future CY OCP claims equal the sum of projected future CY open, closed and pending claims.

Section A calculates the future open claims. It begins with a cumulative reporting pattern, which is applied to AY ultimate claim counts to project the cumulative reported claims as of year-end for each of the future calendar years. The future calendar year opened claims equal the difference between the cumulative reported claims at the year-end and the prior year-end.

In a similar fashion, Section B calculates the future closed claims. A cumulative closing pattern is applied to AY ultimate claim counts to project the cumulative closed claims as of year-end for each of the future calendar years. The future calendar year closed claims equal the difference between the cumulative closed claims at the year-end and the prior year-end.

Section C calculates the future pending claims. A pattern of claims open at the end of each calendar year is derived by subtracting the cumulative claim closing pattern used in Section B from the cumulative claim reporting pattern used in Section A. This pattern is then applied to AY ultimate claim counts to project the number of open claims as of the end of each calendar year. The future calendar year pending claims are the average of the open claims at each year-end and the prior year-end.

[3] See Section 8 for a more complete discussion of these variables.

10. Conclusion

These alternative methods attempt to improve upon shortcomings of the two established methods.

The authors appreciate the fact that the ULAE reserve has become something of a "second-class citizen" on the balance sheet. One reason could be that it is not possible to retrospectively test the reserve adequacy. However, for many companies the ULAE reserve is a non-trivial portion of total reserves. It deserves a non-trivial amount of research and effort in the development and evaluation of its reserving methods.

Even if these new methods are not used to calculate the ULAE reserve, they can be used as a reasonability check for the selected reserve based on PTP and/or Johnson. The selected reserve could be used to back into the implicit parameters of the claim staff method, for example. These implicit parameters could then be assessed for reasonability and consistency year over year.

It is hoped practitioners will use these new methods and report on their effectiveness in future CAS publications. It is also hoped additional reviews of the Johnson method will be published.

References

Johnson, Wendy, "Determination of Outstanding Liabilities for Unallocated Loss Adjustment Expenses," *PCAS LXXVII*, 1989, p.111.

Kittel, John, "Unallocated Loss Adjustment Expense Reserves in an Inflationary Economic Environment", *CAS Discussion Paper Program*, 1981, p.311. Also the discussion by Bill, R., pp.332-343.

Exhibit 1
Company XYZ Commercial General Liability

Claims Closed Over Calendar Year

	Report Year	RY+1	RY+2	RY+3	RY+4	RY+5	Total
(1) Count Closed	10,000	5,000	5,000	5,000	2,500	2,500	30,000
(2) Average Size	2,500	10,000	25,000	75,000	100,000	150,000	40,000

Claims Closed Over Calendar Year, Emergence of Steady State Claims Portfolio

Quadrant II, 2005

(3) Report Year	(4) Count of Claims Closed Over Calendar Year						
	2000	2001	2002	2003	2004	2005	2006
2000	10,000	5,000	5,000	5,000	2,500	2,500	
2001		10,000	5,000	5,000	5,000	2,500	2,500
2002			10,000	5,000	5,000	5,000	2,500
2003	-	-	-	10,000	5,000	5,000	5,000
2004	-	-	-	-	10,000	5,000	5,000
2005	-	-	-	-	-	10,000	5,000
2006	-	-	-	-	-	-	10,000
Total	10,000	15,000	20,000	25,000	27,500	30,000	30,000

Quadrant I, 2005

Quadrant II, 2005

(5) Report Year	(6) Average Size, Claims Closed Over Calendar Year						
	2000	2001	2002	2003	2004	2005	2006
2000	2,500	10,000	25,000	75,000	100,000	150,000	
2001	-	2,500	10,000	25,000	75,000	100,000	150,000
2002	-	-	2,500	10,000	25,000	75,000	100,000
2003	-	-	-	2,500	10,000	25,000	75,000
2004	-	-	-	-	2,500	10,000	25,000
2005	-	-	-	-	-	2,500	10,000
2006	-	-	-	-	-	-	2,500
Total	2,500	5,000	10,000	23,000	30,000	40,000	40,000

Quadrant I, 2005

Quadrants I and II, Claim Counts and Average Sizes

(7) Quadrant	(8) Count	(9) Avg Size
I	10,000	2,500
II	20,000	58,750

Exhibit 2
Company XYZ Commercial General Liability

Claims Open at End of Calendar Year

	Report Year	RY+1	RY+2	RY+3	RY+4	RY+5	
(1) Count Open	20,000	15,000	10,000	5,000	2,500	-	Derived From
(2) Average Size	58,750	75,000	100,000	125,000	150,000	N/A	Derived From

Claims Open at End of Calendar Year, Emergence of Steady State Claims Portfolio

Quadrant IV, 2005

(3) Report Year	(4) Count of Open Claims at End of Calendar Year						
	2000	2001	2002	2003	2004	2005	2006
2000	20,000	15,000	10,000	5,000	2,500	-	-
2001	-	20,000	15,000	10,000	5,000	2,500	-
2002	-	-	20,000	15,000	10,000	5,000	2,500
2003	-	-	-	20,000	15,000	10,000	5,000
2004	-	-	-	-	20,000	15,000	10,000
2005	-	-	-	-	-	20,000	15,000
2006	-	-	-	-	-	-	20,000
Total	20,000	35,000	45,000	50,000	52,500	52,500	52,500

Quadrant III, 2005

Quadrant IV, 2005

(5) Report Year	(6) Average Size, Open Claims at End of Calendar Year						
	2000	2001	2002	2003	2004	2005	2006
2000	58,750	75,000	100,000	125,000	150,000		
2001	-	58,750	75,000	100,000	125,000	150,000	-
2002	-	-	58,750	75,000	100,000	125,000	150,000
2003	-	-	-	58,750	75,000	100,000	125,000
2004	-	-	-	-	58,750	75,000	100,000
2005	-	-	-	-	-	58,750	75,000
2006	-	-	-	-	-	-	58,750
Total	58,750	65,714	73,333	78,500	81,905	81,905	81,905

Quadrant III, 2005

Quadrants III and IV, Claim Counts and Average Sizes

(7) Quadrant	(8) Count	(9) Avg Size
III	20,000	58,750
IV	32,500	96,154

Exhibit 3
Company XYZ Commercial General Liability
Paid ULAE to Expected Paid Loss Method

(1)	(2)	(3)				
Accident Year	AY Ult Loss	% of Ultimate Loss Expected to be Paid By Calendar Year				
		Calendar Year				
		1991	1992	1993	1994	1995
1984	184	4.0%				
1985	254	6.0%	4.0%			
1986	262	10.0%	6.0%	4.0%		
1987	273	13.0%	10.0%	6.0%	4.0%	
1988	269	17.0%	13.0%	10.0%	6.0%	4.0%
1989	299	22.0%	17.0%	13.0%	10.0%	6.0%
1990	304	17.0%	22.0%	17.0%	13.0%	10.0%
1991	237	11.0%	17.0%	22.0%	17.0%	13.0%
1992	246		11.0%	17.0%	22.0%	17.0%
1993	255			11.0%	17.0%	22.0%
1994	270				11.0%	17.0%
1995	293					11.0%
(4) Expected Paid Loss = *SumProduct[(2), (3)]*		273	273	266	264	266

(5)	(6)	(7) = *(4)*	(8)	(9) = *(8)/(6)*	(10) = *(8)/(7)*
Calendar Year	Actual Paid Loss	Expected Paid Loss	Paid ULAE	Actual PTP Ratio	Expected PTP Ratio
1991	265	273	33	12.5%	12.1%
1992	288	273	32	11.1%	11.7%
1993	266	266	31	11.7%	11.7%
1994	297	264	30	10.1%	11.4%
1995	227	266	29	12.8%	10.9%
Total 1991-1995	1,343	1,342			

Exhibit 4
Company XYZ Commercial General Liability
Claim Staffing Method

Preliminary Values

A1. Claims Staff Count for CY 1998	150
A2. Total OCP Claims for CY 1998	34,998
A3. **Workload** = A2 / A1	233
A4. Total Paid ULAE for CY 1998	8,500,000
A5. **Average Paid ULAE per Staff** = A4 / A1	56,667

Other Input Values

C1. Workload Decrease Rate	80%
C2. Minimum Workload	50

ULAE Reserve Calculation

(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Calendar Year	OCP Claims	Workload	Implied Staff Count	Trend in Average ULAE	Average ULAE per Staff	Projected ULAE =(4)x(6)	
1998	*34,998*	*233*	*150*	*3%*	*56,667*	*8,500,000*	***Actual***
1999	26,040	187	140	4%	58,933	8,250,667	
2000	20,834	149	140	5%	61,880	8,663,200	
2001	14,678	119	123	6%	65,593	8,067,914	
2002	9,256	96	97	8%	70,840	6,871,502	
2003	4,736	76	62	8%	76,507	4,743,461	
2004	2,485	61	41	10%	84,158	3,450,486	
2005	1,163	50	24	10%	92,574	2,221,776	
2006	521	50	11	10%	101,831	1,120,145	

(8) Total Reserve = 43,389,151

= Sum of (7) for 1999-2006

Exhibit 5
Company XYZ Commercial General Liability
Derivation of Projected Future CY OCP Claims

A - Projected Cumulative Claim Reporting Pattern

Accident Year	Acc Yr Ultimate Claims	Calendar Year 1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1989	9,900	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1990	10,320	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1991	11,100	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%
1992	11,460	95%	98%	99%	100%	100%	100%	100%	100%	100%	100%
1993	11,640	90%	95%	98%	99%	100%	100%	100%	100%	100%	100%
1994	11,280	80%	90%	95%	98%	99%	100%	100%	100%	100%	100%
1995	12,960	65%	80%	90%	95%	98%	99%	100%	100%	100%	100%
1996	12,480	50%	65%	80%	90%	95%	98%	99%	100%	100%	100%
1997	14,100	40%	50%	65%	80%	90%	95%	98%	99%	100%	100%
1998	14,880		40%	50%	65%	80%	90%	95%	98%	99%	100%
(A) Projected Future CY Opened Claims			13,446	7,910	6,812	4,884	2,810	1,421	712	290	149

B - Projected Cumulative Claim Closing Pattern

Accident Year	Acc Yr Ultimate Claims	Calendar Year 1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1989	9,900	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1990	10,320	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1991	11,100	96%	98%	100%	100%	100%	100%	100%	100%	100%	100%
1992	11,460	92%	96%	98%	100%	100%	100%	100%	100%	100%	100%
1993	11,640	85%	92%	96%	98%	100%	100%	100%	100%	100%	100%
1994	11,280	70%	85%	92%	96%	98%	100%	100%	100%	100%	100%
1995	12,960	55%	70%	85%	92%	96%	98%	100%	100%	100%	100%
1996	12,480	35%	55%	70%	85%	92%	96%	98%	100%	100%	100%
1997	14,100	20%	35%	55%	70%	85%	92%	96%	98%	100%	100%
1998	14,880		20%	35%	55%	70%	85%	92%	96%	98%	100%
(B) Projected Future CY Closed Claims			12,925	10,574	8,783	6,197	4,203	2,114	1,127	580	298

C - Projected Pending Claim Pattern

Accident Year	Acc Yr Ultimate Claims	Calendar Year 1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1989	9,900	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1990	10,320	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1991	11,100	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%
1992	11,460	3%	2%	1%	0%	0%	0%	0%	0%	0%	0%
1993	11,640	5%	3%	2%	1%	0%	0%	0%	0%	0%	0%
1994	11,280	10%	5%	3%	2%	1%	0%	0%	0%	0%	0%
1995	12,960	10%	10%	5%	3%	2%	1%	0%	0%	0%	0%
1996	12,480	15%	10%	10%	5%	3%	2%	1%	0%	0%	0%
1997	14,100	20%	15%	10%	10%	5%	3%	2%	1%	0%	0%
1998	14,880		20%	15%	10%	10%	5%	3%	2%	1%	0%
(C) Projected Future CY Average Pending Claims			8,628	7,556	5,238	3,596	2,243	1,200	646	294	74