

**1990 CASUALTY LOSS RESERVE SEMINAR**

**1A: CONSIDERATIONS IN SETTING LOSS RESERVES**

**Faculty**

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MS. TOM: This morning, we have two speakers. I am Darlene Tom. I am a Vice President with Fireman's Fund Insurance Companies, and my major responsibility is setting loss reserves for my company. I have been associated with the insurance industry for 15 years.

My cospeaker is Alan Crowe and he is with William M. Mercer. He is an associate consultant and he has been with the insurance industry for six years. The purpose of this session is to review some basic definitions and concepts that are often encountered in loss reserving practices. First, we'll define what a loss reserve is, touch upon some key important accounting aspects, and discuss some key dates that are used when evaluating loss reserves.

We'll also get into some of the major elements of a loss reserve provision including loss adjustment expense. Next, we'll cover the basic principles that are used in evaluating loss reserves; what is an actuarially sound reserve, and the principle of uncertainty.

Lastly, we'll conclude with a discussion of some major considerations that are made when setting loss reserves: the data elements organization; and, the application of judgment.

(Exhibit 1)

Let us start by defining Loss Reserves. It is the amount a company sets aside to settle outstanding claims. When a company closes out an accounting period (a year, quarter, or month), the company must have a provision called loss reserves which represents all future payments to be made on claims that have occurred up to that point, regardless of whether or not the company has been notified of the loss.

A key characteristic of a loss reserve is that it is an estimated liability. The precise amount is not known until the claims are finally settled. Consequently there is always a certain level of uncertainty in the estimation of loss reserves.

There are several reasons why loss reserves are important. They represent the largest financial obligation of an insurance company. Reserves are a major component in evaluating the financial condition of a company - whether or not the company will be around to honor its financial obligation to the claimants. Consequently, the accuracy of the financial condition of an insurer is dependent upon the accuracy of the loss reserve estimates.

Reserves are also important in the valuation of underwriting income - whether or not a company has made or lost money during the year.

And that leads us to an important accounting aspect of Loss Reserves.

(Exhibit 2)

Loss reserves fulfill the basic accounting principle of matching revenue and costs. In determining the statement of underwriting income for a given accounting time, you start with revenue, the amount of earned premium, and deduct from that the costs that are incurred in the period to arrive at the amount of profit or loss. The costs are equal to the overhead expenses plus losses from claims arising during the period, the amount paid on these claims as well as any future payments to be made, or a reserve amount. Thus, loss reserves helps to match your costs, a major component being the losses incurred in the period, to the revenue or earned premium generated in the same period.

When you add the amount of loss reserves for all claims that were incurred to date, you obtain the total amount of reserves for an insurer. That is the amount that appears on the balance sheet, the statement of financial condition.

The balance sheet is comprised on two parts. First is the assessment of economic worth, assets. The other part is the assessment of all financial obligations, or liabilities. For an insurer, the single largest liability is loss reserves, the financial obligation to the claimants. Typically, loss reserves represent 75% to 85% of the total liabilities. The difference between Assets and Liabilities is equal to Surplus.

Loss reserves play a major role in the measurement of surplus. The amount of loss reserves can range between 2 to 5 times the amount of surplus depending upon the types of coverages being written and the historical growth of the particular insurer. An error in the reserve estimate of 5% can impact surplus 2 to 5 times that amount of 10% to 25% of surplus.

What happens to underwriting income if there is a change in reserve estimates? Let's refer back to our equation for underwriting income of revenue less costs. A change in reserve estimates would affect the cost side of the equation. Your costs would now include another component, in addition to losses from claims which occurred in the current period. You must now add the change in assessment reserves for claims from prior periods. This is a very common accounting view of underwriting income where loss costs are measured as losses from current period claims plus the change in assessment of prior years' reserves. This view of losses is called calendar period losses.

When there is no change in estimate of prior years' reserves, calendar period losses are equal to accident period losses.

When the change from prior years is other than zero, calendar period losses are not equal to accident period losses. In this case, the underwriting income for a given year is distorted.

(Exhibit 3)

There are some important dates to keep in mind in evaluating loss reserves. The first is the accounting date. The accounting date defines the group of claims for which liability exists, that is, all claims incurred up to that point in time. The claims are the financial obligation for the insurance company.

The other important date is called the valuation date, which defines the time period for which information is included in estimating the reserve. This information typically includes all the actual loss transactions that were reported to that company as of the given valuation date.

An initial estimate of the reserves for a given accounting date can change at subsequent valuation dates, as more and more of the information is reported to the company. So, for example, an evaluation of year-end 1986 reserves valued as of June 1990 would be an estimate of the reserve required for claims that occurred on or prior to 1986, based on all the reported loss transactions up through June of 1990.

That estimate would probably differ from the initial estimate which was based on claim transactions reported through year-end 1986. The reserve estimate can change at subsequent valuation points. Essentially, the estimate of reserves is revised as additional information is obtained.

(Exhibit 4)

Now I'd like to cover the difference between a carried loss reserve and an indicated loss reserve. The carried loss reserve is the amount of loss reserves shown in a company's published financial statement, such as the balance sheet. An indicated loss reserve is the estimated amount of what the reserve should be and is generally the result of a particular loss reserve evaluation procedure.

The indicated loss reserve amount, again, can change at subsequent valuation points.

The adequacy of the carried reserve is the difference between the carried loss reserve and the indicated loss reserve. When the carried loss reserve is substantially greater than or equal to the indicated loss reserve, the carried reserves are considered adequate and the difference between the carried and indicated reserve is called the reserve margin.

When carried reserve are less than the indicated reserve, the carried loss reserves are said to be deficient, with the amount of the deficiency equal to the difference between the carried and the indicated reserve amount. Usually, that number is expressed as a negative number.

We often hear the term reserve strengthening or reserve weakening. There is often some confusion about what these terms mean. Some would define strengthening or weakening as simple the change in the carried reserve from one accounting period to the other. If reserves have increased, then they must be 'stronger'. This is not necessarily true.

Reserve strengthening and reserve weakening refers to the change in the reserve margin from one accounting period to the next. So if the difference between the carried versus indicated reserve is minus \$25 million at the close of one accounting period, a deficit of \$25 million, and that difference narrows to zero, or no margin or deficit, then the amount of reserve strengthening is equal to \$25 million. Your reserve margin has increased from a deficit position of \$25 million to reserve adequacy.

If there is no change in the margin or deficit from one accounting period to the next, then there is no reserve strengthening or weakening. The change in your carried reserve is simply the initial carried reserve amount, minus the payments that were made during the year on prior years' claims, plus a new reserve amount for new claims incurred in the current year.

So, if there is no change in the reserve margin, the change in the carried reserve is simply the natural progression of reserves over time. You take your old reserves, make payments from those old reserves, then add in new reserves for the new claims that were incurred.

If you have reserve strengthening, the gap between your carried reserve and your indicated reserve increases over time, so either your deficit is shrinking or your margin is increasing. If you have reserve weakening, this gap gets smaller. Either your margin is decreasing from one accounting period to the next or your deficit is increasing.

With reserves weakening, calendar year results are better than your accident year results. The change in reserve is less than the change that would be required to support new liabilities.

(Exhibit 5)

Examine the elements of a loss reserve provision. Here is a list of the major elements. Typically, a company will value reserves based on some subgrouping of this list.

The first component is case reserves, and those are the estimates made by the claims adjusters for future payments on claims that have been reported to the company.

The next category is formula reserves. Formula reserves are an amount that is set aside for a specific group of claims. Oftentimes, they are derived by using an average value applied to all the claims with similar risk characteristics. For example, a

company may use an average value of \$1,000 for all physical damage claims.

The next category is called development on known claims, often referred to as supplemental case reserves. If you were to track the estimates made by the claims adjusters on a group of claims over time, the estimates would probably change as more facts become known to the claims adjusters. The change in the estimates is called development on known claims. Some companies will want to track this separately from the rest of their reserves because it gives them a report card of how well the claims adjusters are doing in estimating final settlement values.

Then you have reopened claims reserves. Reopened claims can occur when there is an initial settlement, but after the settlement has been made, an additional claimant comes forward or an additional injury is discovered. The overall loss reserve provision has to account for the fact that some of the claims that were initially settled will ultimately reopen at some subsequent date.

Next is pure IBNR or pure incurred but not reported claims. These are claims that have occurred but have yet to be reported to the company.

Lastly, there are claims in transit. Claims in transit are those which have been reported to the company, but have not yet been entered onto the company records. Again, some companies will want to track this to monitor the backlog in the field offices.

(Exhibit 6)

Let's take a look at the life cycle of the claim to get a better handle as to what these distinctions truly mean. In our illustration, an accident occurs when our insured is rushing off to start a week-long vacation. So, on April 2, 1988, an accident occurs.

The claim exists, but it has not yet been reported to the company, so it exists as pure IBNR. Our insured doesn't report the claim until he returns from vacation ten days later. Once it's been reported to the company, it's a claim in transit. It hasn't yet been entered onto the company books, but it has been reported to the company.

Four days later, that claim finally gets onto the company records and an initial formula reserve, an average value, is put up. The formula reserve exists until the claims adjuster has enough time to investigate the claim and set up an individual case reserve amount, which doesn't happen until about four to five weeks later.

The claims adjuster has to go out, interview the witnesses and claimants, review the medical reports, and repair costs

estimates, and doesn't come up with a case reserve estimate until four to five weeks later.

Three months have transpired and now we are into August. The claims adjuster has obtained additional information about the injury and the accident, and revises the case reserve amount.

Six months later, a settlement is reached; a payment is made four days later. It is not until the claim draft clears that the claim is closed and the case reserve is taken down. So, there is quite some time that can transpire between the settlement agreement and when the claim is finally closed.

Different companies may use different procedures as to when to close a claim. Some companies may not close it until the claim draft clears. Other companies may not close it until the release is signed by the claimant.

Even after the claim closes, there is a slight possibility that the claim may reopen. So, the company has to have included some amount for the slight possibility that the claim may reopen, and that amount is usually encompassed in a bulk reserve amount.

(Exhibit 7)

In addition to loss reserves, a company must have a provision for loss adjustment expenses, the expenses that are incurred in adjusting a claim. There are primarily two distinctions in loss adjustment expense.

The first category is allocated loss adjustment expense, those are costs that can be assigned to a specific claim. A major expense is attorney fees, the costs that are incurred in securing legal representation for defending the insured against claims in suit. This, by far and away, is the largest component of allocated loss expense and, furthermore, of loss adjustment expense, in general.

Allocated expense also includes the court costs associated with defending the claim in suit, and for some companies, the use independent adjusters. When the independent adjuster fees can be identified on a specific claim-by-claim basis, companies may choose to include these costs as allocated loss expense. Or the company may choose to include it as unallocated loss expense because the function performed is very similar to their own in-house adjusters.

The other type of loss adjustment expense is unallocated loss adjustment expense or costs which cannot be assigned to a specific claim, generally the cost that is associated with running the claims department. It would include salaries and benefits, over head costs, the cost of rent, the space the claim adjusters occupy, cars, supplies.

It would also include a provision for company overhead or their share of the corporate expense. For example, there are many support services within a company that are not directly assignable to either OA&G or loss adjusting functions, so the company may choose somewhat arbitrarily to assign part of their overhead to the claims adjusting function. Lastly, it may include independent adjuster fees.

The setting of reserves for loss adjustment expense has proven to be quite a problem for the industry and there are a number of reasons for this. One is that many companies do not capture case reserves on allocated loss expense, so the only information that you have got is the allocated loss expense payments. So, there is a lot less information available to set loss expense reserve levels than there is for losses where there exist at least the adjusters' case reserve estimates.

The other problem is that the increase in loss expense often outpaces the inflationary increase on losses. Many companies do not include a trend for the loss adjustment expense in setting their reserve levels, so loss adjustment expense has often proven to be deficient for many companies.

(Exhibit 8)

Now, I'd like to talk about some of the principles that are used in setting loss reserves. The first is a fundamental objective of the entire loss reserving process, achieving an actuarially sound loss reserve.

An actuarially sound estimate is a provision for the unpaid amount required to settle all claims, whether reported or not, for which a liability exists on a particular accounting date. Generally, this estimate is for a defined group of claims. It consisting of all claims that were incurred on or prior to the accounting date. The reserve estimate is measured as of a given valuation date, that date encompassing the reported loss transactions that have been reported to the company.

Most importantly, the estimates are derived from a reasonable set of assumptions and appropriate methods. It's possible that, say, five years ago, a reserve estimate was developed and based on the information that was available at that point. From that information, reasonable assumptions were formulated, and a set of methods which appeared appropriate at that time was selected.

Unfortunately, five years later, the reserve estimate is updated and the estimate is now twenty percent higher. Was the initial estimate actuarially sound? It depends on the conditions which caused the estimate to be off. Was there information that was available five years ago which could have led one to a more appropriate set of assumptions?



If the initial estimate, based on available information was based on a reasonable set of assumptions and appeared appropriate at that time, then probably the initial estimate was sound, despite the fact that the revised estimate indicates a twenty percent error and that the company was technically insolvent when the initial estimate was made.

A lot of actuaries and a lot of reserving specialists find themselves in the situation where with 20/20 hindsight, they see their estimate is now twenty to thirty percent off. It does raise the question: Why were you off and what should have been in place to prohibit that kind of inaccuracy or that amount of mis-estimation.

Another important part about this principle is the reference to the appropriateness of the actuarial methods. Not all methods provide the best estimate in every reserving situation. The greatest challenge in setting reserves is identifying the method that is most appropriate for the particular situation being reviewed. That is the hardest part of the whole reserving process.

You can see that the principle is not so much a standard for accuracy. It's impossible to determine what the level of accuracy in the reserve estimate is. It's more of a standard for maintaining discipline and integrity throughout the reserving process .

(Exhibit 9)

You have a similar principle for loss adjustment expense that parallels that for loss reserves. It's a provision for the unpaid amount required to investigate, defend and effect the settlement of all claims, whether reported or not, for which a liability exists as of a given accounting date.

Basically, it represents all the future payments to be made associated with loss expense for claims that were incurred up to the accounting date for a defined group of claims. It is measured as of a given valuation date and, again, the estimate of the loss expense reserve can change at subsequent valuation points.

Finally, the estimates are derived from a reasonable set of assumptions and appropriate methods, the most important aspect of the principle.

The next principle is uncertainty and, at this point, I'm going to turn this discussion over to Alan, but I'll leave you with this cartoon.

(Exhibit 10)

It depicts two reserving specialists, obviously discussing their reserve estimates. They are both working with the same set of facts, but their conclusions differ here. Nonetheless, in both cases, their conclusions are wrong. With that, Alan.

MR. CROWE: The problem with this slide is that if you ask two actuaries what a reserve estimate is, you'll get three answers, none of which is 100% correct.

What I'd like to talk to you today about is uncertainty in the loss reserve and, equally as important, the consideration that once you have an estimate, what are the parameters you can check it against. Also what are some ways you can say how confident you are in your estimate, given the assumptions you've made.

Today, you're going to talk about various methods of coming up with reserve estimates. I want to stress that these methods are very good, but they will probably all give you different estimates. You have to know what your underlying assumptions are, what impact they will have on your estimates, then kind of throw it all together and pick a number that you can stand behind and support.

There is always uncertainty in a reserve estimate and the reason for that is because you're trying to predict a future contingent event. The loss has occurred, but the claim may not have been reported yet. Since some claims are not reported yet, we are trying to estimate what is going to happen in the future.

(Exhibit 11)

The true value of liability for loss or loss adjusting expenses is only known when all claims have been settled. Even then, some claims reopen. There is a lot of variability in what you may pay for one claim versus another, who sets the reserves on it, and so forth.

I'll talk a little later about some internal factors that can affect your reserve estimate as well as some external economic factors that can affect your answers. The estimation of liability implies a range of reserves can be actuarially sound.

The range of estimates may widen based upon the line of business you are reserving. There are statistical methods to determine confidence intervals, which is basically a confidence range around that point estimate.

There are also reasonability checks, which I'll talk more about later. When you get your reserve estimate, what are the ways to check it against last year's and the year before to see what is causing changes?

As far as the confidence range; by using statistical measures you can obtain confidence intervals by looking at loss distributions

and finding some parameters, such as the average claim size, the average number of claims, the likelihood of new claims, and running simulation models, which generate random claims, based on your assumptions. Then you can pick 95 percent, 90 percent confidence levels and so forth.

I think I'd rather spend time on once you get a reserve estimate, what are some parameters you can check it against and what might influence it to change later. Generally, you will use several varying methods to estimate a reserve.

These methods will give you different answers, so you need to sort through your assumptions again and find which methods you think are capturing the right changes in your historical data. I'll also speak about those in a moment.

An appropriate reserve within a range depends upon the likelihood of the estimates and the financial reporting context in which it is used. I think the confidence that you need to put on your reserves may depend on who it's going to be provided to.

If it's for internal management, they may not worry as much if it's 96 percent confidence or 95 percent confidence if they want a range for planning purposes. There's also external views of reserves where the shareholders or the insureds view things a bit differently than the management, a bit differently than the regulators who may be worried about solvency.

You also need to estimate liabilities if there's an acquisition. You want to make sure you know what the true liabilities have been for the company, how they are operating, and so forth. Also, you probably need to estimate liabilities if you're performing a commutation.

If you're purchasing someone else's liabilities, it's similar to buying a car. You want to make sure you're getting a good deal, so you need a confidence range about that, but it might be a little tighter or a little looser than others. There's also liabilities that need to be analyzed for reserve certifications. When you certify reserves, you want to be fairly confident that the estimates are reasonable.

You also need to do project liabilities for pricing to find out what your past losses have been compared to the premiums you've collected, to arrive at a measure of rate adequacy.

(Exhibit 12)

A key date I'd like to discuss is the accident date, the date on which the loss occurred. The report date is when it's reported to the insurer. The recorded date is when it's recorded on the books of the company.

A claim may be reported to the claim department, but they haven't entered it into the books yet. We cannot get that information unless we talk to the claims people. We talked about the accounting date and the evaluation date.

Some of the methods we'll learn about this morning allows us to go back and test how well those methods have worked in the past. There is a means of altering your valuation date to see how well your methodology works and picks up changes in the data.

(Exhibit 13)

Some typical data elements for losses are paid losses which are how much you've actually paid for your claims. The case reserves are claims that the Claims Department know about. They may be set up on an average reserve or case by case basis.

For instance, they may set the average bodily injury claim at \$5,000 as an initial estimate, or they may go through and set it on what they actually think it's going to settle at. You need to know your Claims Department and how they're reserving. We're trying to estimate what is going to happen to the case reserves and how they're going to develop through time. We use that data to project things that aren't even on the books yet, so we need to understand all the components that underlie it. Incurred losses would be the sum of paid plus the ending case reserves. This is how much you expect to pay on known claims.

On the expense side, there are paid allocated loss adjustments and allocated reserves. They follow the payments and estimate the future payments. There is also an unallocated section that she discussed. Basically, on unallocated reserves, we follow the paid unallocated patterns. It's difficult to set up unallocated reserves.

Reported claims are those that the Claims Department know about. Closed claims are those the Claims Department feels are closed and are not going to reopen. Reopened claims are those that the Claims Department thought had closed but were reopened. Pending claims are the claims still open.

The above are the loss components. A way of seeing if the estimated reserve made sense is to have some measures of volume to compare the reserves. These are; written premium; written exposures; earned premium and earned exposures. For earned exposures, you think of cars or houses; some measure of the volume of business you're doing.

Written premium and earned premium are also measures of volume. They have inherent in them rate adequacy, and it's another assumption that when you use premium, that you're using the same historical premium adequacy. You need to be able to account for that, so each assumption needs to be measured through time.

Now that we know what kind of data we need, how do we go about finding organizing data into some useful manner. Generally, you try to get claims that behave alike. I just have to subdivide the data that have the same characteristics.

(Exhibit 14)

For example, homeowners separated by coverage for homeowner's property versus homeowner's liability. For automobile, maybe auto bodily injury versus auto property damage versus comprehensive, versus collision.

We try to break out the data that's going to behave the same through time, because as we'll find in these next few sessions, using historical data to project what's going to happen in the future, we want data that's going to behave the same in the future that it did in the past.

That's all well and good, but I find that it doesn't always happen that way. There are other things that I'll talk about, the internal and external considerations that affect the way the past losses have behaved.

(Exhibit 15)

There is another factor to subdividing data that we try to use which is the credibility of data. Credibility is a measurement of the predictive value that is attached to data. Credibility is how credible is the data you're using, how confident do you believe that the data will behave the same, and so forth.

The group of claims should be large enough to be statistically reliable. Again, there are ways of statistically measuring the credibility. I look at it from a more judgmental perspective. We try to break the claims down as far as possible into groups that behave the same, but if you take a piece of pie and you cut it up into too many pieces, all we get are crumbs.

There comes a point where you have to measure the credibility versus the homogeneity and try to get the two to mesh together, so that you're working with good data that you think is going to behave the same, but it's still credible enough to use.

There are credibility measures that in the next few sessions may be discussed. There's a point of partitioning, where to divide the data into groups too small to provide credible development patterns is possible.

Development patterns refer to tracking a claim through time. At the end of one year, you may think that the loss is going to be "X" dollars. A year later, it's "Y" dollars. A year later, it's "Z" dollars. So, we try to make sure that that development stays consistent through time.

You can increase the consistency through using credible, homogeneous data. It's one of the tougher things, to see how to divide the data depending on the size of the company. Large companies can break their claim data down into a lot finer detail than a small company that just writes homeowners and auto. If it can't be broken into, say, uninsured motorist, medical payments and so forth, you may need to do various groupings with those sized companies.

(Exhibit 16)

Emergence in settlement patterns. Emergence is basically the delay between the occurrence of a claim and when it's recorded on the company books. A good analogy to the difference in emergence patterns might be between automobile bodily injury and homeowners.

If you have a claimant who gets hurt, say, he hurts his back and he has a claim. He doesn't know that he's hurt his back for a year or two. The date between the occurrence and when it's recorded can be two years, if you just started feeling bad after two years.

Whereas, a homeowner's claim, if a guy's house catches on fire, he pretty much knows that his house has caught on fire, so the reported date for that would be much faster.

The average BI claim may not be reported for a year and a half, and your homeowner's claim is reported shortly after it happens. This helps to gain an appreciation of why we don't group auto BI and property claims together. We would get a masking effect of what our losses look like and how they'll develop.

Settlement is the delay between the reporting of the claim and when it's settled. Let's use that BI and homeowner's claim again. With BI, even though it's reported, the insured may be incurring hospital expenses, medical expenses and so forth, so they may not be willing to settle until he is sure of what the claim is going to cost.

With homeowners, they notify you of the damage and replacement cost. They can monitor that very quickly. Settlement on the homeowners would come fairly quickly. There is still a time lag between what they estimate, perhaps, and what the final settlement is. It's a lot shorter for property than it is for liability lines.

(Exhibit 17)

Here's a chart of actual emergence and settlement patterns. Collision would fall into what we refer to as the short tail line, where the "A" stands for the accident date; the "E" is when the loss is reported or recorded; and, "S" is the settlement.

You can see for the collision line, you have an accident that's reported fairly quickly and settled fairly quickly.

When we go to the automobile bodily injury, it's a little longer between the accident date and the emergence date. In this chart, it's not significantly different. But, look at the difference between when it's recorded and when it's settled. There's a much, much longer settlement period.

When we go down to worker's comp, there is generally a larger gap between the accident date and the emergence date. There's even a longer gap between settlement and when it's reported. Then, we've got products liability which is a long time between emergence and settlement, and also a very long time, usually, between accident date and the emergence date.

As you move from a property-type coverage to a heavy liability line, the methods and assumptions you use will have an increased impact on the confidence levels because the uncertainty is much larger on these types of claims.

(Exhibit 18)

Now, I'd like to talk about some factors that affect loss reserves. We'll talk about internal considerations first, considerations within the company that may affect the changes. The first one is reinsurance plans. Reinsurance is basically the insurance of insurance.

Reinsurance is when you insure a certain risk, then get those risks insured for certain limitations. For example, if you have \$100,000 excess of loss reinsurance, you maintain the first \$100,000 of each claim; the excess portion goes to the reinsurer.

If you historically are at a \$100,000 reinsurance limit and you set your loss reserves accounting for reinsurance, then every loss would be limited to \$100,000. Suppose all of a sudden, the company goes out and buys \$250,000 excess of loss reinsurance. Instead of maintaining the first \$100,000, you now maintain the first \$250,000.

So, you need to know what the reinsurance arrangements are when you look at the reserves, because the larger the losses are, the more erratic one-time losses become.

You also need to know how the program is structured. They may have certain occurrence coverages or aggregate coverages. You need to know how the loss adjustment expenses are treated. They may be covered proportionately to losses or they may not be.

Nowadays, it's probably a good idea to find out who is reinsuring the losses in case they can't come through with the financial backing that they thought they could. The reinsurer's financial strength should be analyzed.

Another component is structured settlements. Structured settlements are to account or to recognize the time value of money in the claims. That is, if you have a claim that is going to make dollars of benefit payments for a long time, they may discount those to account for the time value of money. You need to know if the data you are looking at already has a discount factor built into it.

Contract changes, also affects the reserve estimation process. You need to know what the contract for the reinsurance might be. You also have a variety within the policyholder contracts. For example the company may now be selling larger deductible sizes.

There might be a shift in policy limits. Perhaps, the historical policy limits were \$50,000 and now they've shifted up to \$100,000 or maybe \$250,000. The losses basically had a built-in capping effect because the company usually wouldn't pay more than the policy limits. Now, those historical dollars are not at the same level as today's claims because you've taken out the limitation from the contract.

Perhaps, they've changed exclusions in the contract. Pollution liability usually comes to mind when thinking of an exclusion. You can try to exclude it. Whether the courts allow you to exclude it or not is maybe another issue, but you need to know if there are new exclusions in the contract for certain types of claims. Perhaps the contract covers less than they were historically.

There's also a variety of endorsements that go along with all of the different coverages. Perhaps now they write new endorsements. Basically, you need to find out what is it that's going into the loss data you're looking at and try to adjust for changes.

There's also organizational changes within the company that may affect the data. One type of an organizational change may be a new manager in the claim department. These people are the ones that are setting up the data that you're going to analyze, so you need to understand how their philosophy differs from that of the people who previously set the reserves.

They may include more people in the claims department. If files were sitting open on the claims department desk and you add more people, you'll see an influx of claims. You'll think, "Oh, things are just surely getting worse because look at the number of claims compared to what we used to have." The difference is, they're just getting them put into your statistical base faster. They're moving them from the desk into the record files.

We also need to consider the mix of business. In mix of business, I tend to think of the coverages you're writing. If you're a large insured and have a lot of data, you can look at BI



separately from property damage and so forth. A lot of companies are not large enough to look at it by coverage, so we might have to combine a few of the liability lines.

You can tell from the emergence pattern we had up before that, depending on the line of business, you're going to get a different emergence to settlement rate, the number of claims, how fast they're reported and so forth.

We should see if the distribution by coverage within our data set has shifted.

Case reserve adequacy. We talked about pending claim dollars, which is open case reserves. Case reserve adequacy describes the accuracy of the reserves. When a claim is reported and you think the claim is going to cost \$1,000, does it settle for \$1,000 or does it settle for 500 or does it settle for 3,000?

As long as case reserve adequacy is fairly consistent, you're okay, because most of the methods will throw in any development on case reserves as a component in IBNR. However, if the case reserve adequacy changes, we must adjust our methods and assumptions.

We need to see if the reserves are being set up, one, like they used to be; and, two, are they as adequate or inadequate as they used to be? We need to know how the case reserves are developing.

Business growth. Business growth would also depend on where you're growing at. Claims will vary for several reasons. For example, whether you're writing in Ohio or whether you're writing in Florida or Massachusetts, your claims behave certain ways depending on the way they're occurring at. We need to monitor where the growth in business is and what types of regulations and laws are in effect.

Additionally, if you're growing "away from home", you may have to get more external claims adjusters as you may not have the capacity to set up a shop to handle the claims processing.

This would be a case where you'd have to look at your allocated loss adjustment expenses in the cost of decentralization.

Claim handling practices might also fall under the organizational changes in the claims department. Different claims departments have different philosophies. Some claim philosophies are such that they say, "We're going to try to predict it to the dollar the first day we know about the claims."

Other philosophies are, "Well, we're going to set up an average reserve based on the type of claim. Then, we'll come back and revisit it in a month or two months or whenever we can get back to it." So, we need to know whether they are trying to set a

true estimate for the reserves or if they're just trying to set up an average reserve for what that average claim will pay.

Additionally we need to know if they switch from an average reserving method to a per case type basis. Claims handling practices are also an important factor. If you handle your claims faster and you pay them faster, then you'll see that come through your data, much like the number of claims. You say, "Oh, the number of claims are up." Then you say, "Oh, boy, the payments are up." Maybe historically at the end of the first year, you'd pay 25 percent of them and now you're paying 40 percent. You think, "Boy, I'm just going to pay lots more. I've already paid 15 percent more than I ever did before." Well, you need to make sure that it's not from some restructuring and that it is bad things happening and not just a switch in procedures.

(Exhibit 19)

Environmental factors and changes in underwriting practices also affect the estimation of loss reserves.

When reserving, you need to know from underwriting, if they are tightening the criteria? Are they making it pretty tough to be an insured? Are they loosening them to gain market share or entrance into the market?

Society can have a very large impact on the liabilities of an insurance company. Societal views is usually called claim consciousness. If they feel they're owed for any accident that happens, they put public pressure on the insurance company and consequently the industry. The states you write business in is very important. In some states, there's a higher average claim or claim frequency.

Regulation may have an effect on loss reserves. Regulators may have a higher or lesser need for confidence levels depending on their purpose of review.

For example, worker's comp may have a retroactive benefit clause, and even though the accident had occurred, anyone who had a claim or has a future claim for an occurrence back then may get new benefits. This makes it difficult to project reserves.

Judiciary decisions might include pollution liability, where it's more difficult for insurers to avoid paying certain claims. Judiciary decisions can set forth precedence to pay claims or not to pay claims, to determine what is an occurrence and when the occurrence date is.

If you have a policy that is to cover a certain timeframe and the occurrence date falls within that policy limit, then you're liable for it because it's occurred within the limits. If a court decides that the occurrence actually occurred prior to or after that data, the legal liability will vary depending on the decision and the definition of the occurrence.

There's seasonality effects when you set reserves. For example, some lines of business seem to incur claims closer to hurricane season. Consequently, we may need to account for the seasonality in claims.

The residual market also affects the reserve estimations. Losses are pooled so we need to understand the relationship as it affects the residual market.

Inflation is a key component to predicting reserves. It will probably cost more to settle a claim tomorrow than it did yesterday. We need to understand how a claim that occurred last year or two years ago or three years ago relates to the same claim occurring today. One thing we do with our data is to adjust the data for inflation if we were estimating what the IBNR or reserves would be from past historical data.

Also, economic conditions will affect your losses and your liabilities and, consequently, the reserves. For instance, the increased fuel prices would probably cut down on the number of miles driven for vacation and so forth, which might cut down on the frequency of claims. When the economy is not going good, you sometimes have a period of increased claim consciousness. We should monitor the frequency and average claim cost to account for what the economic conditions of the period we are reserving for should reflect.

(Exhibit 20)

The last component is the application of professional judgment. We've talked about a lot of this, but the loss reserve is a point in time estimate of a company's outstanding liability. It's a point in time estimate because when you go back to do it at a later point, you are not estimating as much of the unknown.

If you look at all accidents that occurred in 1986, at the end of 1986, you had just a little bit of experience to work with. Now, if you go back and look at those reserves today, you've got an additional four years of development, so you're better able to project those reserves. The more experience you have, generally the better the reserve estimate.

The reasonableness of loss reserves should be measured against relevant parameters. I like to think of using these neat methods that we'll all learn about in the next day and a half or so, and getting a range of reserves from those methods. Then I have to pick an estimate that gives me confidence to say, "I think this is what your liability is going to be."

Before we can do that, we have to see if that estimate makes sense. We use the term "professional judgment." It's judgment. It's an educated judgment, experience judgment and so forth. What I like to do once I get my answer is to see what kind of inferences I can draw from it. For instance, we can take the

ultimate liabilities and divide it by earned premium and look at loss ratios. If you start to see loss ratios that change through time, then you need to be able to account for that. This is one way of seeing if your loss reserves caused something to change, or if the premiums caused the ratios to change.

We have a loss ratio parameter you can look at to see if the loss reserves are telling you what other indications are telling you. I like to know what sort of rate indications they need, and see if the loss reserves are similar to what the rate indications would imply. If they are similar, I feel better about my reserve estimates telling me what the rates are also telling me.

I also like to measure the loss reserve results on a pure premium basis. Pure premium is the average loss per exposure, whether it's a policy or car or sales. We can see if the resulting pure premium is explainable.

We'll talk the next few sessions more about other methods, but it gives you a good feeling if you can explain why the average loss is going up and so forth, instead of running through a method and saying, "Well, here's the answer". You need to explain your assumptions to everyone involved to make sure the reserves make sense.

I also like to look at severity of claims, which is the average claim size. If everything stayed the same and inflation was going up, you should see your average claim payment go up.

But, even in checking your severity and pure premium and so forth, you have to go back and adjust things for reinsurance limitations, policy limitations, etc., because these will drive your average claim size or your average loss per exposure. I also like to look at frequency, which is the expected number of claims per exposure. This differentiation helps to see if it's the average value of the claims coming in higher, or if we have more claims coming in.

If I see that the frequency is way up, I talk to the claims department and ask, "Do we have more claims coming in?" Is it truly more claims or did we change something in our claims processing which would cause this."

So, we get our estimate, then we work backwards to see if it makes sense with all the parameters and assumptions we've used. We can also estimate the average severity and the average frequency and if we think it follows some mathematical curve, we run simulations on it. This is a common approach to calculate our confidence intervals. We can then say we are 95% confident that the estimate will fall in this range or 75% within another range.

I'd like to open the floor up for discussions now if anyone has any questions for me or Darlene. How many people here are from an accounting background?

(Show of hands.)

MR. CROWE: How many are from an actuarial background?

(Show of hands.)

MR. CROWE: How many from a legal background?

QUESTION: I have a question. My question is for the reserving, what is an occurrence-made policy versus a claims-made policy have an affect on your reserving?

MR. CROWE: An occurrence would basically date to when the occurrence happened. If you had the loss liability for that, you'd track it on when the claim occurred. Claims made is the tracking of your loss on when the claim is made. So, on an occurrence, there's no relationship or there's not as much of a relationship as to when the claim is reported to you as when it's occurred. Claims-made is based on when the claim is reported or made.

MS. TOM: I'd like to respond to the question. If you turn to Exhibit 17, that chart showed the different reference points between the accident date, the emergence date, and the settlement date. Under a claims made policy, you would see the grey part of the bar being a lot shorter, where there is relatively very little time between the date of loss and the date on which the claim was discovered or manifested itself, essentially when it emerged. Whereas, on an occurrence policy, that gray part of the bar can be very long, the date of loss or the date of whenever you want to define "occurrence" to be and date of the actual manifestation date, which can involve several years to several decades.

So, claims made basically speeds up the information flow of a loss. It can really shorten the development period. But even under claims made, the black part of the bar, which is the date of emergence to final settlement can be very long, so you can still have a very long tail under claims made.

Okay, thank you.

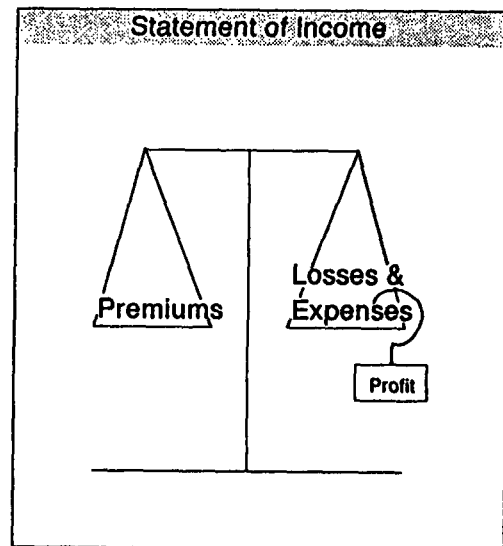
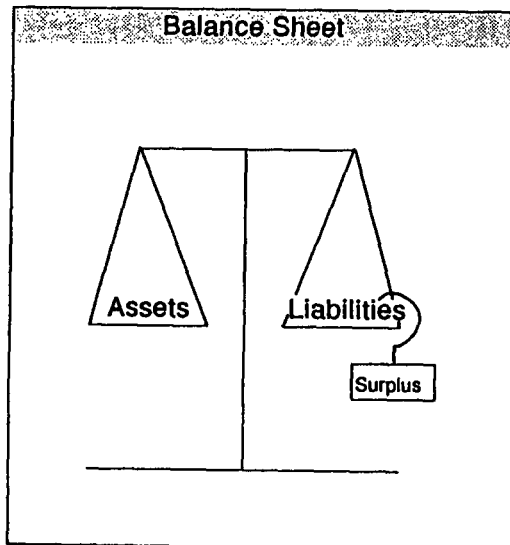
(Applause)

## LOSS RESERVE

<b>DEFINITION:</b>	Amount set aside to settle outstanding claims.
<b>CHARACTERISTIC:</b>	Estimated liability.
<b>IMPORTANCE:</b>	Accurate evaluation of financial condition and underwriting income.

## ACCOUNTING ASPECTS OF LOSS RESERVES

Fulfills Basic Accounting Principle of Matching Revenue and Costs



## KEY DATES

<b>ACCOUNTING DATE:</b>	Defines a group of claims for which liability exists; namely, all claims incurred on or before the accounting date.
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<b>VALUATION DATE:</b>	Defines the time period for which transactions are included when evaluating the existing liability.
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### **CARRIED LOSS RESERVE**

The loss reserve amount shown in a published statement or in an internal statement of financial condition.

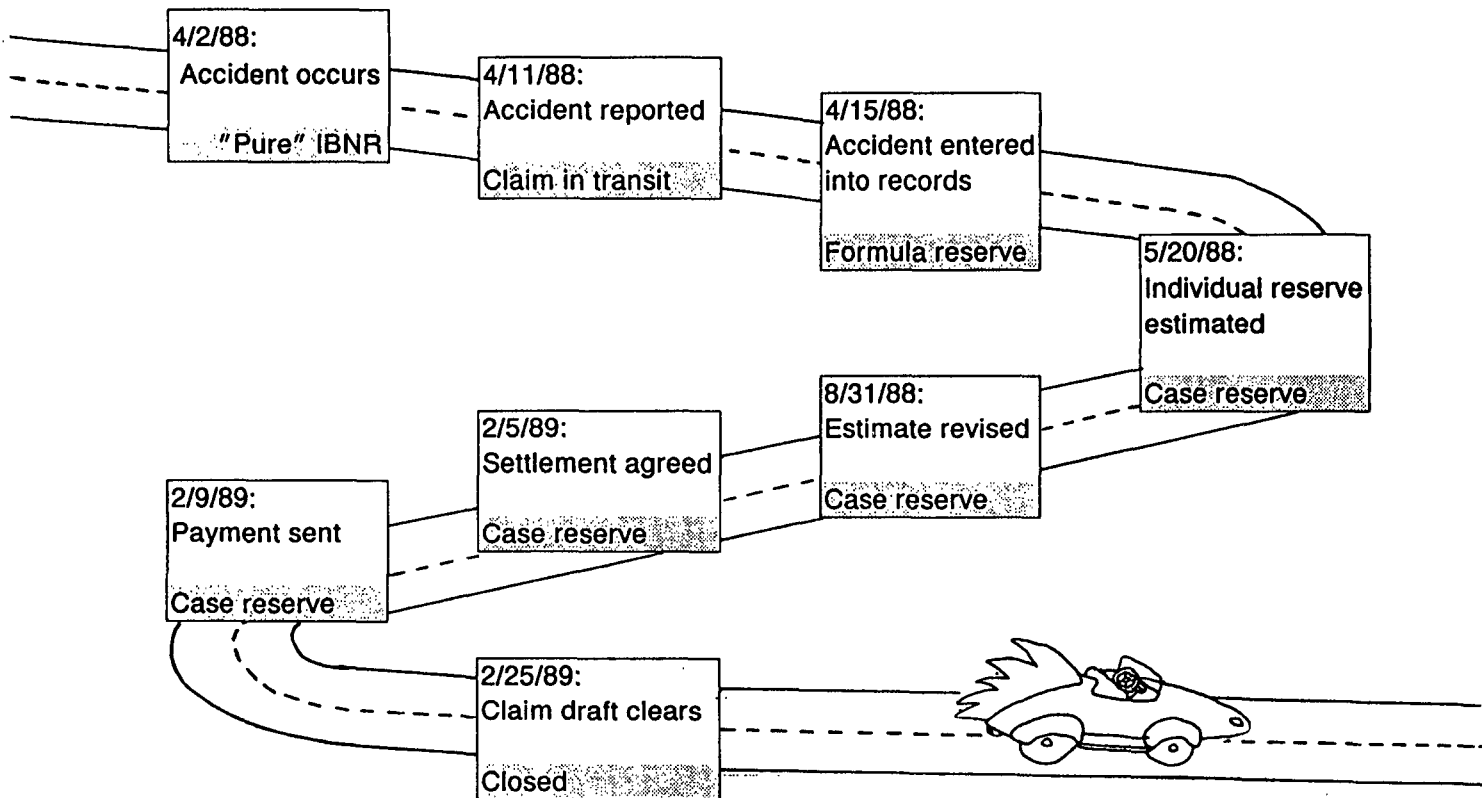
### **INDICATED LOSS RESERVE**

The estimated loss reserve that results from the application of a particular loss reserving procedure.

### ELEMENTS OF A LOSS RESERVE

- o Case Reserve
- o Formula Reserve
- o Development on Known Claims
- o Reopened Claims Reserve
- o "Pure" IBNR
- o Claims in Transit

### LIFE CYCLE OF A CLAIM RESERVE





## LOSS ADJUSTMENT EXPENSES

### Allocated: can be assigned to specific claims

1. Attorney fees
2. Court costs
3. Independent adjuster fees\*

### Unallocated: cannot be assigned to specific claims

1. Claims department salaries/benefits
2. Claims department overhead – cars, rent, supplies, etc.
3. Company overhead
4. Independent adjuster fees\*

\* Depends upon billing detail

Exhibit 8

## ACTUARIALLY SOUND LOSS RESERVES

### DEFINITION

A provision for the unpaid amount required to settle all claims, whether reported or not, for which liability exists on a particular accounting date.

### CHARACTERISTICS

For:	A defined group of claims
As of:	A given valuation date
Based on:	Estimates derived from reasonable assumptions and appropriate actuarial methods

## ACTUARIALLY SOUND LOSS ADJUSTMENT EXPENSE RESERVES

DEFINITION	
<p>A provision for the unpaid amount required to investigate, defend, and effect the settlement of all claims, whether reported or not, for which liability exists on a particular accounting date.</p>	

CHARACTERISTICS	
For:	A defined group of claims
As of:	A given valuation date
Based on:	Estimates derived from reasonable assumptions and appropriate actuarial methods

## UNCERTAINTY



## UNCERTAINTY

- |   |
|---|
| <ul style="list-style-type: none"> <li>o The true value of the liability for loss or loss adjustment expenses at any accounting date can be known only when all attendant claims have been settled.</li> </ul>  |
| <ul style="list-style-type: none"> <li>o The uncertainty inherent in the estimation of these liabilities implies that a range of reserves can be actuarially sound.</li> </ul>  |
| <ul style="list-style-type: none"> <li>o The most appropriate reserve within a range of actuarially sound estimates depends on both the relative likelihood of estimates within the range and the financial reporting context in which the reserve will be used.</li> </ul> |

Exhibit 12

## KEY DATES

<b>ACCIDENT DATE:</b>	The date on which the loss occurred.
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<b>REPORT DATE:</b>	The date on which the loss is first reported to the insurer.
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<b>RECORDED DATE:</b>	The date on which the loss is first entered into the statistical records of the insurer.
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<b>ACCOUNTING DATE:</b>	Defines a group of claims for which liability exists; namely, all claims incurred on or before the accounting date.
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<b>VALUATION DATE:</b>	Defines the time period for which transactions are included when evaluating the existing liability.
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## TYPICAL DATA ELEMENTS

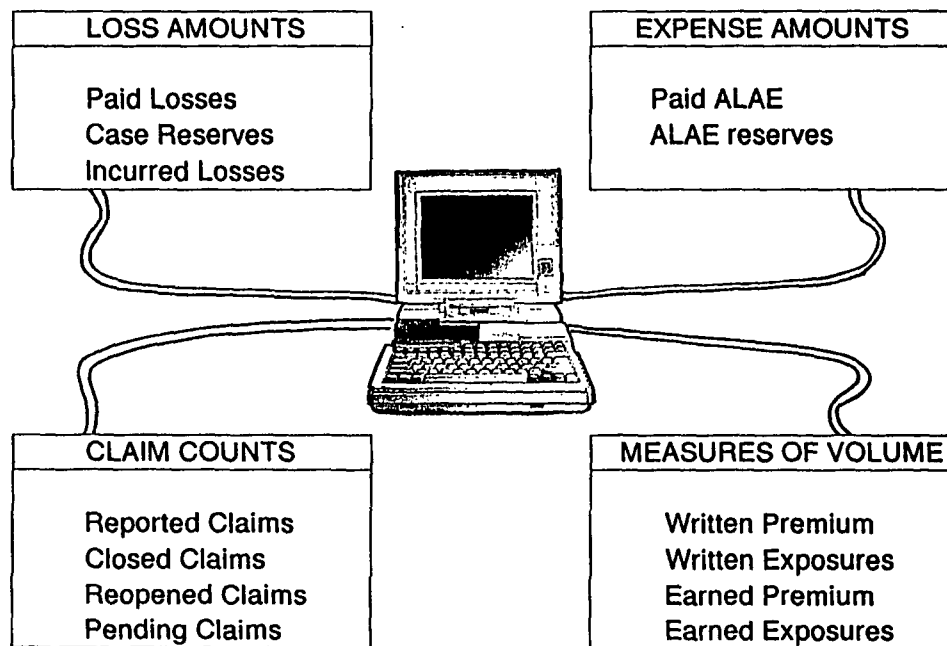
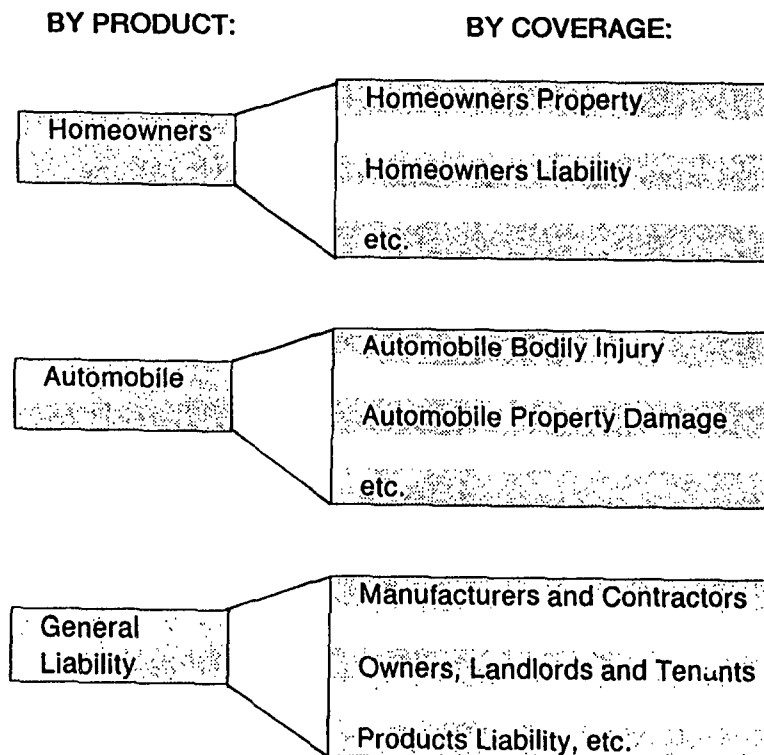


Exhibit 14

## HOMOGENEITY

Loss reserving accuracy is often improved by subdividing experience into groups exhibiting similar characteristics. For example:



## CREDIBILITY

- o Credibility is a measure of the predictive value that is attached to a body of data.
- o A group of claims should be large enough to be statistically reliable.
- o There is a point at which partitioning will divide the data into groups too small to provide credible development patterns.

## EMERGENCE AND SETTLEMENT PATTERNS

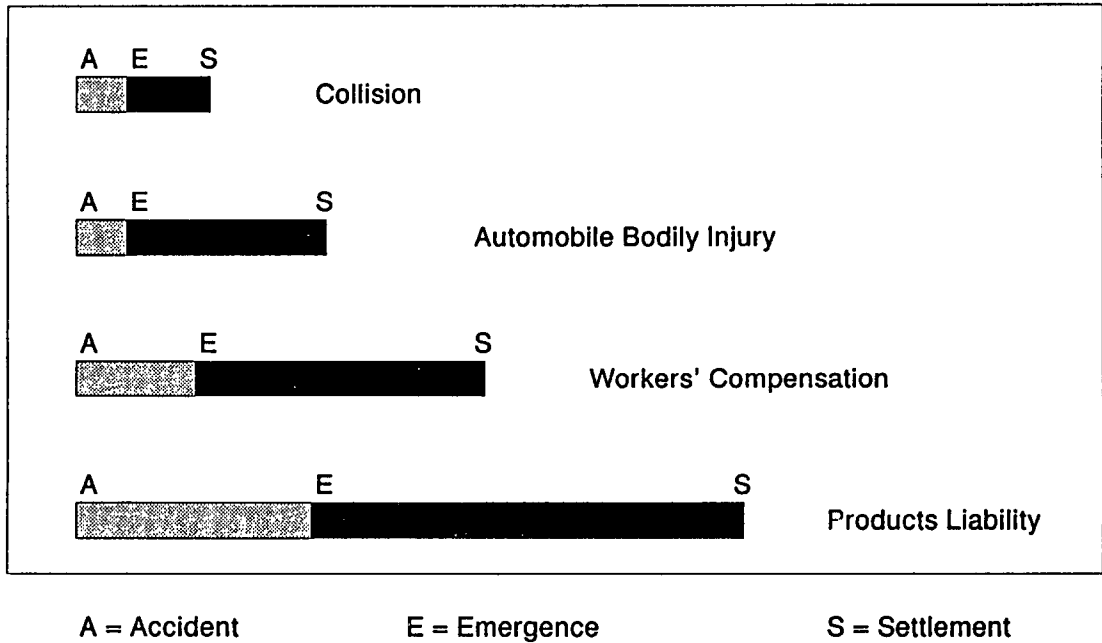
### EMERGENCE

The delay between the occurrence of a claim and when it is recorded on the company books.

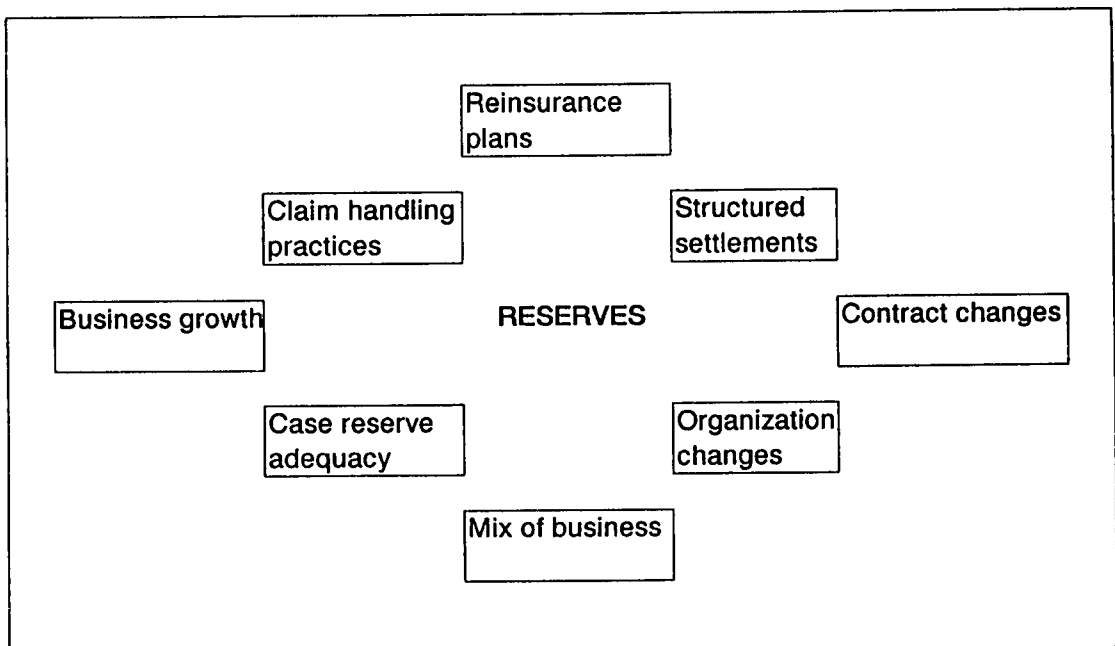
### SETTLEMENT

The delay between the reporting of a claim and when it is settled (closed).

## EMERGENCY AND SETTLEMENT PATTERNS



## OPERATIONAL (INTERNAL) FACTORS CAN AFFECT SETTING LOSS RESERVES



## ENVIRONMENTAL (EXTERNAL) FACTORS CAN AFFECT SETTING LOSS RESERVES

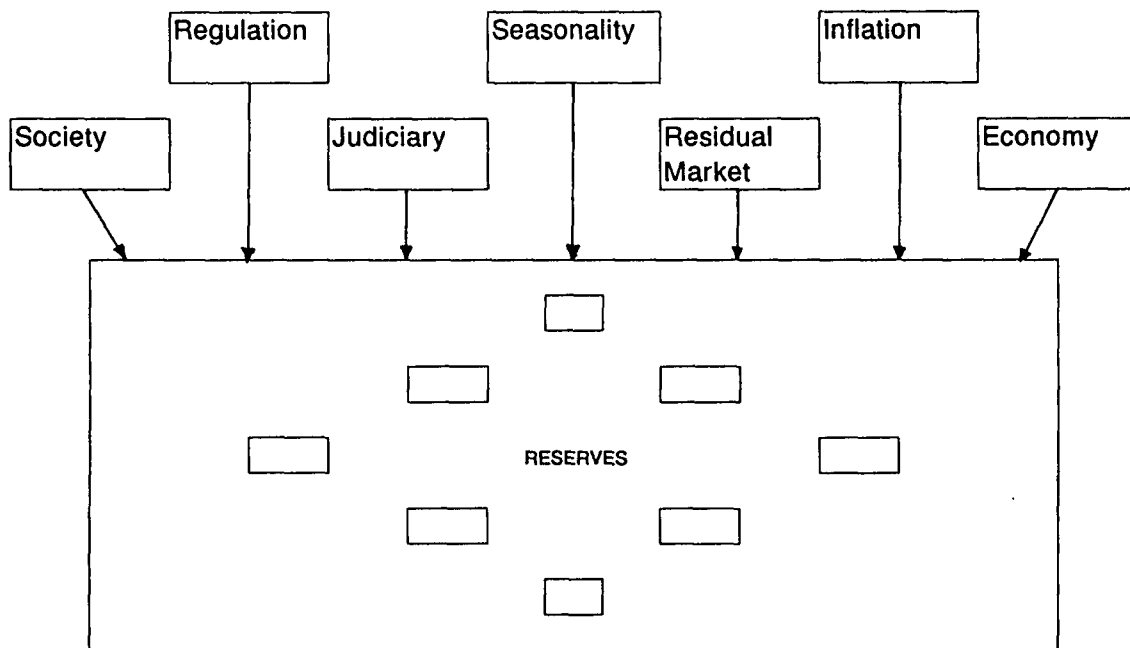


Exhibit 20

## APPLICATION OF PROFESSIONAL JUDGMENT

- o Loss reserve is a "point in time" estimate of a company's outstanding liability.
- o Reasonableness of loss reserve should be measured against relevant parameters.
- o Underlying assumptions and methods should be documented and subjected to sensitivity analysis.

