

# RESERVING FOR REINSURANCE -II

SESSION 3-D  
1987 LOSS RESERVE SEMINAR  
MINNEAPOLIS, MINNESOTA

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September 10, 1987

Good afternoon. My name is Regina Berens and I work for Prudential Reinsurance. My background also includes seven years at AFIA, which was formerly the American Foreign Insurance Association. For the last eight years I've been doing reserves on reinsurance, but there are some people out there who could probably also discuss this subject and will probably have some different ideas. You know who you are; please speak up.

## CLASSIFICATION OF DATA

- At a minimum: Pro Rata vs. Excess
- Annual Statement lines may not be meaningful
- If credible data is available:  
Working-level Excess vs. High-Layer (e.g. Catastrophe) Excess
- Property vs. Casualty vs. Marine, Others
- Contracts with credible contract year, accident year, etc. data vs. those reported on a bordereau basis

First, we'll talk about classification of data. I assume that everyone has either been to the last reinsurance session or has had enough experience that they know some of the terminology. At a minimum, you should be separating your business between pro rata (or quota share) business and Excess of Loss, which is sometimes referred to by inept secretaries and people who know the business as "Excessive Loss". Another way to divide the data is to do Facultative separately, and I'll mention that later.

For reinsurers, the Annual Statement lines of business are not necessarily meaningful. Many reinsurance contracts cover an entire class of business written by the ceding company, such as personal lines business. This is especially true for

catastrophe reinsurance. Sometimes the ceding company will make an honest effort to separate the accounts- premium and losses- by line. Sometimes premium is not available by line, but losses are.

Obviously you want to try doing property, versus casualty, versus some of the others. Don't worry about splitting auto liability between personal and commercial, for example, because you probably won't get meaningful data. If you have enough data, you may want to separate your excess business between working-level and catastrophe level, since you would expect them to develop differently.

Pro rata business, particularly that written on a portfolio basis, may not have experience split by contract year or accident year-- this is the way the market works. An accounting statement, for example, may simply show a total for outstanding losses for all five years you've been on the contract. It is

better to try and do something with that data separately.

You may want to look at your data on a gross versus net basis, or gross, retroceded and net. It's probably most common for companies to do their analysis on a net basis, but it's more interesting to look first at what you took in and then at what you retroceded out, and then net them against each other.

Retrocessions may not even be in your data-- sometimes they're on green sheets in the accountant's desk. (I know of one computer system sold to reinsurers five years ago that didn't do retrocessions.) You should also make sure that any retroceded data you have is a "mirror image" of the assumed business it covers. This sounds elementary, but frequently a ceded reinsurance transaction will be coded to the contract year of the retrocession agreement, which may not be equal to the contract or accident year of the assumed business transaction. The same may be true for line of business coding.

In some companies certain reinsurance contracts have specific retrocessions. In other words, you might purchase reinsurance from several companies covering a single assumed contract. That's one complication. Sometimes your retrocessions or ceded reinsurance may cover the whole book-- a catastrophe cover, for example. In this case you may find that the premium for this protection was taken out of a single line of assumed business, and not allocated among premium on all the business it covers.

## UNDERWRITING QUESTIONS

- Special Contract types-  
IBNR provision reported  
Funded covers  
High aggregate deductibles  
"Clean-cut" cancellations
- Rate adequacy changes-yours and  
the ceding company's
- Availability of pricing data

One of the first places in your company to start asking questions is the Underwriting Department. First, there are some contract types which will distort the data if not analyzed separately. Some ceding companies report an IBNR provision with their accounts. If these contracts are written, find out if the suggested IBNR is booked, and to what account. "Funded Covers", which stabilize the results of the ceding company

by allowing them to reimburse the reinsurer for a portion of the adverse loss experience over a period of several years, should be isolated because much of the IBNR could be reimbursed. Contracts with very high aggregate deductibles should also be isolated. These contracts require that the ceding company absorb claims

which would ordinarily be paid under the contract up to a certain limit-- which could be in the millions of dollars-- before the reinsurer is liable. These contracts could appear "loss-free" for years.

Some reinsurance contracts are cancelled on a "clean-cut" basis, meaning that the ceding company has taken back the loss portfolio and the reinsurer is no longer liable for losses on the contract. Since IBNR would not be anticipated on these contracts, they should also be isolated.

Ask the underwriters about price adequacy changes-- both yours and the ceding company's. It is important to know if a doubling of last year's premium volume means your rates have doubled or your exposure to loss has doubled. Ask if data was provided for pricing the contract-- if this is not an area where your actuaries are active (and it should be), all kinds of interesting things may fall out of the files.

## CLAIMS QUESTIONS

- Changes in your company's claim processing practices
- Are adjustments made to reserves reported by the ceding company?
- Are claim audits conducted regularly?
- Do you request periodic reports of claims falling under the retention for aggregate deductible contracts?

The Claims Department is another place to stop and ask questions. First, there is the classic question of whether there have been any changes in reserving practices which might distort historical data. Ask also if they make adjustments on individual claim reserves reported by the ceding company based on their assessment of the case and, if so, how these adjustments are booked. Some large reinsurers perform periodic claim audits of ceding

companies. This gives them information on how the ceding company's claim practices are changing. You should also ask if they maintain data on losses falling under the ceding company's retention on contracts with high aggregate deductibles, which can be used to monitor your company's potential losses once the aggregate retention has been reached.

The Accounting Department can help if you find aberrations in the data you can't explain-- particularly if you can pin it down to a single contract. My favorite example, from a former employer, was a huge claim in an area where no one knew of any major catastrophes. It turned out that an account had been rendered in Italian Lira, and the accountant (who was in the

London office) coded it as Pounds Sterling. Once we got that out of the data things didn't look so bad.

You should also ask about "top-sheet" or "non-ledger" adjustments-- the ones that get put into the company results but for some reason are not in your data. You should ask about major changes to prior accounting periods, which were put through in the current period. If you can't get the historical detail to allocate the corrections to the periods where they belong, at least get them out of the current results.

## BORNHUETTER-FERGUSON

- **GOOD FOR:**  
Some working-level excess.  
Some pro rata business.
- **NOT APPROPRIATE FOR:**  
High-level (e.g. catastrophe) business.  
Contracts with aggregate deductibles.  
Pro rata contracts reporting on a bordereau basis.  
Funded covers.

Once you have your data, you have to select an appropriate method. The first I'll cover is the Bornhuetter-Ferguson method--and other methods which depend on the use of loss triangles. They are good for a lot of things but have some serious limitations. On working-level excess business where there aren't any major changes, you can probably get reliable results, taking into account the caveat I just gave you on talking to the

underwriters, accountants, claims people, etc. and making sure there is nothing messing up the triangle. It's good for pro rata business if you trust the detail by contract year. It's not appropriate for high-level excess business, catastrophe business, anything where the reporting is very slow. As I mentioned before, it's not appropriate for aggregate deductible contracts.

These methods are also not appropriate for pro rata contracts reported on a bordereau basis, or for funded covers, where you could eventually recover many of the losses. Another item to check is whether your underwriters have had the good sense to put aggregate limits on losses payable under the contracts, in which case a triangulation approach will over-state your IBNR.

RAA factors are another popular method for setting reserves on reinsurance business. RAA is the Reinsurance Association of America, and they have been collecting incurred loss experience by accident year from reinsurers since 1956-- for Excess of Loss business only, separately for Auto Liability, Medical Malpractice, Workers' Comp., Asbestosis, General Liability excluding Asbestosis, and Casualty not Otherwise Classified.

## RAA FACTORS

- **GOOD FOR:**
  1. Some excess business, particularly after 2-3 years of development
  2. Some pro rata business, if adjustments are made for faster reporting
- **NOT APPROPRIATE FOR:**
  1. Very high-level excess business
  2. Low- volume or immature experience
  3. Pro rata business where results are reported on a bordereau basis

Claims-made experience was requested separately for the first time this year. Every two years, a report of incurred loss triangles and age-to-age factors is sent out to member companies; copies are also available from RAA's office in Washington, D.C. Please note-- this is not an endorsement. I'm covering it because RAA is one of the few sources of historical reinsurance data, and it is a popular source when little else is

available. Let's go over the uses and limitations.

What are RAA factors good for? They are good for excess business that is comparable to the underlying mix of business and retentions in the data. That's a tricky question, since you don't necessarily know what kinds of retentions underlie the experience that these companies have reported. It's more useful for data with a few years of development.

Let's go over an example. Using the "Percentage of Ultimate Reported" curve for 24 months of development on General Liability, the "average" percent reported is 17%. Taking the two sides of the 50% confidence interval, you could have 6% or 28% reported. Suppose you have \$1 million in premium for this year and \$100,000 of reported losses after 24 months. Depending upon which of the above factors is appropriate, your ultimate losses on \$1 million of premium could be \$357,000, \$588,000 or \$1,667,000. And that's just the spread on the 50% confidence interval-- it's even wider if you want to use 75%. As you can see from this example, even at two years there's an extremely wide margin for error.

RAA experience is now total excess business. It may in the future show facultative experience separately-- it was requested last year, but neither that nor claims-made was shown in the last RAA report, so they may not have gotten a lot of it. It may be something you'll have in the future.

RAA factors might be appropriate for pro rata business if you've got experience by contract year and if you make adjustments for the fact that reporting is faster. They are not appropriate for very high-level excess business since it probably is not comparable to the mix of business being reported by the members of RAA. It's not appropriate, unfortunately, for low-

frequency or immature experience, as you saw from the example. This is unfortunate because that's probably when you need it most. It is not appropriate for pro rata business where you don't have results by contract year.

Finally- a big caveat- check your own company reporting patterns. You could be getting losses in faster either because you've got a different mix of brokered versus direct market, or maybe your claims department is faster, or you've got lower retentions. Whatever the reason, if your business is reporting faster than the general RAA average (and you can find that out just by checking age-to-age development factors), using RAA factors to project IBNR can mean that you're getting hit twice. First, you already have more reported at the evaluation point. You're then applying tail factors which assume that what you've already got sitting on your books is still out there with the IBNR. That's probably one of the most important reasons that you have to be cautious.

One of the things that I noticed in the new booklet is that they've shown a graph of the percentage of ultimate losses reported from the current study, from five years ago and from ten years ago -- losses are reporting more slowly, and the curves are really spreading out. What this means is that you can't assume 1986 after 30 years will look the same as 1956 after 30 years. So, you have wonderful historical data but it may not reflect what we're going to see in the future.

Now we'll go over a few thoughts on reserving for individual contracts. First of all, you have to make sure there are valid reasons for it. When I did our last reserve evaluation the underwriters gave me a list of thirteen contracts to analyze individually. Having learned my lesson from the last reserve study I looked up individual reports on each treaty and found that several of them had no premium or losses. The underwriters admitted that these were brand new contracts but there were certain reasons that each contract was unique and they wanted to monitor the experience on it. At that point there wasn't any. The point is to make sure there is a justification for separate analysis or you will drive yourself crazy trying to analyze individual contracts which could reasonably be included with the rest of the book.

Many of the methods we have reviewed or discussed can be used on individual contracts. You really have to take into account the characteristics of the individual contract. You may want to go read the contract and talk to the underwriter. If you've got an extremely large contract you can do loss triangles on it. If it is an aggregate deductible contract, ask for losses under the retention and do an analysis of where your layer will go. When you've done that, check the results against what you're getting on the other contracts in that general group. If this single contract is running a 40% ultimate loss ratio and similar contracts are running around 150%, you have to ask yourself if you really believe it is that much better, or (in some cases)

that it is that much worse. Again, ask about pricing data. Many times actuaries were involved in pricing. You should have separate actuaries involved in pricing and reserving. They should talk to each other -- absolutely. It's been useful for me to ask the pricing people for a file on a particular contract, and the information there is often helpful. One reinsurance actuary observed that using actuaries only for reserving is like not calling a doctor in to see the patient until it's time to call the coroner.

I've already mentioned doing Facultative business separately, but we use basically the same methods. Does anyone else have special methods for the treatment of Facultative business in their company? (NO RESPONSE.)

### SELECTED ULTIMATE LOSS RATIO

- **GOOD FOR:**
  1. Business without credible data; immature years.
  2. A reasonability check on any other method.
- **NOT APPROPRIATE FOR:**  
Business where other methods used on credible data clearly indicate a different ultimate loss ratio.

I also want to discuss selected ultimate loss ratios as a method. This is a good check for reasonableness against any other method. If you've got immature business and you don't know where it's going to go, you're better off setting an ultimate loss ratio on it than you are trying to use some scientific method on one claim. It almost sounds like a disappointment or a cop out to say -- well let's reserve it to an

ultimate loss ratio. But for something like an aggregate deductible contract, it might be a lot more realistic than just lumping it in with the other contracts.

On the other hand, if other methods clearly indicate a different ultimate loss ratio you shouldn't be doing that. If you've got years and years of contract experience that shows that this kind of business is 100% ultimate loss ratio, you don't set the current year at 60%, just because you hope that this year will be better.

When you're setting reserves on reinsurance business, Earned but not Reported premium (EBNR) is extremely important because the premium coming in during a given calendar year may apply to coverage provided several years earlier. EBNR can usually be estimated by the use of premium development triangles, with ultimate levels calculated using the same methods applied to loss triangles. This should be done separately for Pro Rata versus Excess, and separately for Property, Casualty and Other if enough experience is available.

## EBNR

- **METHODS**
  1. Earned Premium triangles
  2. By Contract
  3. Discuss current year with underwriters
- **IMPLICATIONS**
  1. Net out expenses
  2. IBNR on EBNR- can create "instant" profit/loss

EBNR acts as an addition to the asset side of the books; it must be offset by an expense provision and by IBNR on this extra premium, using whatever methods are used to calculate IBNR on reported premium.

Pay particular attention to EBNR on the current year, since you may be projecting ultimate levels from very little data; it should be a reasonable multiple of the prior year's premium volume. In effect, you may be creating an "instant" profit or loss on the current year if you are running at an ultimate loss ratio of 40% or 110%. If the business is extremely good or bad, errors in the estimate of ultimate premium volume can substantially affect the accuracy of your results.

What's in the future? One thing that I think we're going to see is better data from two sources. We're slowly moving towards better reinsurance systems. Most reinsurance systems seem to have evolved from a patchwork of primary company systems and have grown in response to specific needs from specific areas. Now we're seeing more systems designed specifically for reinsurance. I believe also that more companies have gone through trying to design the perfect ultimate system that's going to be everything to everybody. They've found out that it wasn't possible and designed something fairly realistic. I can't underestimate the importance of good data.

I think we're also going to see better data from the ceding companies, especially with changes in the market in recent years. It has been easier to ask for loss triangle experience by contract year, or for the individual claims under the threshold of an aggregate deductible contract. It used to be that the data was "impossible" to get, or the reinsurer could obtain it only after it had lost millions of dollars on the contract and was threatening to sue for being defrauded. I know of one ceding company which finally provided a lengthy computer printout of all of the claims falling under a large aggregate deductible. It was, unfortunately, printed on thermal paper which turned an opaque, illegible blue when exposed to sunlight. I don't think that happens as often now.

Another change I see is that business is becoming more international, which is fascinating. It is almost inevitable that when you're talking about spreading risk, it makes sense to

## THE FUTURE

- Better data??  
(From ceding companies and in-house systems)
- More sophisticated techniques
- More techniques developed exclusively for reinsurance
- Business is becoming more international

do it on a global basis. It's been perfectly normal for many years for an established reinsurer to assume business from state-owned insurance companies in Romania, Brazil or Poland. Even when few other services are traded with a particular country, they will buy reinsurance protection. Reinsurance is frequently a good way to get into the market in those countries.

The international part of the business can be a stabilizing influence-- I've seen both extremes. My company has a nice, sensible, stable book of international business that's not subject to the vagaries of the U.S. market. Inexperienced reinsurers can also get killed in the international market--

ironically, it is usually caused by assuming a portfolio which includes U.S. casualty business.

The companies that are thrown into insolvency by tackling the international market in reinsurance usually end up being replaced fairly easily, however. There is a bank in California which has decided that the residential mortgage business is too risky. Instead, they're going to put their capital into a joint venture in reinsurance with a broker in the London market-- writing U.S. casualty business on a claims-made basis. It should be interesting to see what happens.

I think we're also going to end up with more sophisticated techniques, and we're finally getting in more data to play with. Companies have been in existence for a while and I know there are a lot of new companies starting up, but some of the established ones have 10 to 20 years experience. You can't throw beautiful, high technology methods at small data bases -- it doesn't work.

You also have more experienced reinsurance actuaries. You come into it trying to treat it like primary business and then you start realizing that it works differently. And you start using different techniques and thinking about it differently. I think a major change includes methods comparable to Pre Re's report lag methodology. I have not mentioned it in this session, but we still use it and there's a lot published on it.

In addition to more data, better data, and more sophisticated actuaries, I think there will be more methods

suited particularly to reinsurance -- especially Facultative and Excess of Loss.

Any ideas or any questions? What do you think about the future of reinsurance reserving? It is getting easier or more complicated? Does anyone have any questions?

Q: How do you track results of past reserve evaluations?

R. BERENS: It depends on the method you're using. For example, if you're using loss development triangles, take the ultimate losses that you come up with after this evaluation by contract year and calculate what you should have carried as of 12/83 and 12/84, for example, if we knew then what we know now about ultimate levels. You can also track your predictions of ultimate loss ratios, and even average report lags in our case. In some ways you're begging the question, of course, if you're keeping the same method, since your prediction of what's still out there on old reserves depends upon the accuracy of your method.

You can also predict losses (either paid, known incurred or counts) to come in by year in the future when you do a reserve evaluation to use it as a monitoring tool as experience develops.

Q: How do you set reserves on low-frequency, high-severity business such as earthquake coverage?

R. BERENS: In some cases, reserving to an ultimate loss ratio is the best. On that type of business if you look at your paid loss triangles or your incurred loss triangles you're not going to have any data. One possible way is to do a more sophisticated exposure study; I did one on Caribbean hurricanes in 1978, and someone has done a windstorm model recently. You get an idea of your exposure if you look at property values along possible hurricane paths, for example.

We're going from one extreme, which is setting an ultimate loss ratio, to the other, which is a full-scale exposure study. On some of these there aren't really any textbook answers.

Q: You mentioned international reinsurance. How do you deal with the issue of ranges in foreign currency exchange rates in doing your analysis?

R. BERENS: That's a fun problem-- there are a couple of things you can do. One is to keep the individual currency detail-- you could then set reserves on specific pieces by foreign currency. Usually you end up with Longley-Cook's proverbial collection of crumbs.

When I did our international study, I had two separate cases. One data source converted all transactions at a single set of exchange rates-- we used the current rate. All of the historical transactions were converted at the same rate and therefore you didn't have exchange fluctuations in the data.

Q: But you still have a source of error because you're fixing a set of relativities among currencies that may not have applied in the past.

R. BERENS: Yes, you do-- it's not perfect. Another method used for the rest of the data was to actually request that the underwriters supply to us the distribution of premiums and losses by currency for major groups. (We have very hard-working underwriters.) We then came up with exchange rate "index" factors by contract year and by type of business. We were then able to adjust the development triangles to a current exchange-rate basis. Again, it's not perfect but it's a way to try and get the exchange fluctuations out.

Q: How do you adjust for changing retention levels in your Excess book?

R. BERENS: When we do our IBNR analysis we separate the data into IBNR groups according to the size of the retention. You're right-- if you mix them all together when you're changing the retention sizes in the contract, you're going to have a mess.

Q: How do you account for premium not yet received on in-force contracts at year-end?

R. BERENS: For business written out of the U.S., we calculate EBNR using premium triangles periodically and then update them monthly, according to changes in premium volume. Changes in EBNR go into the IBNR formula. Our Canadian operation does a laborious contract-by-contract analysis of the number of statements that have been received and use that to estimate premium on statements not yet received. It can be done that way, but in most of our business it is not necessary to do a contract-by-contract analysis.

Q: On your age-to-age factors where you eventually multiply one times another times another to get the ultimate-- how do you select your factor? Do you take the latest year, or the average of the latest three years, or five?

R. BERENS: If I think things haven't changed that much, I'll do a weighted average of all the years. By weighted I just mean add up all of the incurred losses reported as of three years of development-- divide by all of the incurred losses reported as of two years of development on the same years. If there are changes in the patterns that I can see I may not use all years. It depends upon how stable you think the book is.

Q: Now I'm going to get on my actuarial soapbox. After you pick the 12-24, 24-36, you multiply them together. When you pick the average of these factors you pick a weighted average, right? I argue that if you're going to, use a geometric average.

Let's use an extreme situation which is not true to life but

it illustrates the point I'm making. Suppose you're dealing with two years of experience. One factor indicated .5 and the other indicated 2. I'm going to use the average of these two factors to multiply the other factors that have been selected the same way. The geometric average to me is the only one to use because if I multiply 2 times .5 I get 1, and the square root of 1 is 1. If I add the two factors together I get 2.5 and the arithmetic average is 1.25. I think that's wrong. I think that when you're talking about numbers that you're eventually going to multiply together you cannot use an arithmetic average. I've used an extreme and unrealistic situation just to illustrate this.

COMMENT FROM AUDIENCE: Of course, that introduces a bias because the geometric average is always lower than the arithmetic average.

Q: Do you ever look at trends in the age-to-age factors?

R. BERENS: One of the things we actually have the computer do is a linear regression on the factors. It's kind of ridiculous if you've got only three age-to-age factors for that particular point of development. Sometimes results are way out of the ballpark and sometimes they are close to what we have selected. It's one of those things I look at and never use.

Q: How do you handle retrospective premium adjustments?

R. BERENS: If they aren't expected to be substantial, they're just treated as part of the EBNR. On our domestic treaty book they actually do a separate contract-by-contract analysis.

Q: Do you handle or do you separate the sliding-scale commission reserves on top of those?

R. BERENS: No, we don't handle that explicitly but it could probably be done individually for large contracts.

Q: How do you calculate IBNR recoverable from your retrocessionaires for purposes of completing Schedule F?

R. BERENS: Practically all of our retrocessions are to one single facility and participation is spread out pretty thinly among many companies. We actually keep the premiums separate on business that is ceded to this facility, so we can set up separate reserves for it, we can do a separate analysis and we know what IBNR we're carrying on that business by retrocessionaire.

Q: How do you prepare Schedules O and P of the Annual Statement using typical reinsurance data?

R. BERENS: Schedules O and P are a pain for reinsurers-- I know, I've done it. You can usually separate out Excess business by line and by year and we put that on Schedules O and P that way for the State of New York. I think we're now going to have to do this countrywide. Up to now, for our reporting to Delaware, we allocated all our experience on assumed reinsurance to the

"Reinsurance" line on Schedule O.

Where we're required to report pro rata business by year, as for New York, we allocate it judgmentally based on the data we have. Schedules O and P are not an exact science for reinsurers. We really do our best but it wasn't really designed for reinsurance companies.

Q: Has any thought been given to including another column on Schedule O or P that would actually show an underwriting year premium, or ultimate premium?

R. BERENS: Does anyone know of any thought in that direction? That's been a chronic problem.

COMMENT: Maybe you could re-state past years' premium as it develops.

R. BERENS: That's one approach. I think the idea of another column being added to the annual statement for ultimate premium estimates is a good one.

Q: If loss experience on prior years shows adverse development but retrospective premium received **because** of that development is coded to the current year, you're over-stating the loss ratio for the old year and under-stating it for the current year.

R. BERENS: You're right-- and another example is a stop-loss contract where you might be covering business that the ceding company wrote over the last ten years. For covering development that occurs in the current year, you get the premium in the current year. You can either decide to code the losses back to the years where they happened, which then makes those years look bad because you have adverse experience and no premium to cover it-- or you put all the loss development in the current year which makes it look like the incurred losses are developing at a horrible rate.

Q: The last speaker was talking about the importance of evaluating the solvency of reinsurers by looking at their Annual Statements.

R. BERENS: I have a paper I'm going to write on that someday! I wasn't there when he discussed that-- I was in here trying to figure out how to work the slide projector. Yes, the Annual Statement is a starting point but sometimes, for reinsurers, the data just doesn't fit into the little boxes we have to put it in.

Any more questions or comments?

Thanks for your participation-- you were a great audience.