ACTUARIAL ASPECTS OF CLAIMS RESERVING IN THE LONDON MARKET

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Abstract

This paper is presented in two parts. The first part provides the reader with an overview of the London Market. The main participants in the market, the type of business written, methods of placing business and some aspects of accounting conventions are described. The role of the actuary is also described.

The second part of the paper then focuses on reserving in the market. Potential problems and limitations of data are described. In some cases simplified examples have been used and they are shown in the Appendix, together with a short description. Note that these examples are fictitious and that they are included only to provide the reader with illustrations of certain points made are the text. The detailed considerations of loss reserving methods are outside the scope of this paper.

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ACTUARIAL ASPECTS OF CLAIM RESERVING IN THE LONDON MARKET

PART I - GENERAL DESCRIPTION OF THE LONDON MARKET

1. ## Composition of the London Market

    The London Market earns around US$20 billion in premium income
    and is therefore sizeable by any standards. Much business is
    led in the London Market and the London lead is often
    important in completing the placement of a risk.   Its
    importance in the world insurance market is therefore much
    greater than the premium volume would indicate.

    Business is obtained from all over the world although the
    United States is the most important source.   Business is
    obtained mainly through intermediaries. London brokers often
    obtain their business through correspondent brokers in many
    parts of the world, including those in the United States. They
    also compete directly with overseas brokers. Professional
    reinsurers play a significant role although this has
    diminished over the last ten years or so.   These companies
    tend to obtain their business directly, rather than through
    brokers. It is important to realise that many foreign owned
    companies participate in London, including US owned companies
    writing specialist US business.

    The attached schematic indicates the function of the market.
    The outer ring is intended to represent the proportions of
    business entering the market from different sources.   The
    middle ring shows the intermediaries who produce this business
    for the market. The centre ring shows the participants in the
    market.

    The London Market is a market with a large number of players
    and intermediaries and takes on many of the classic
    characteristics of a market.   The efficiency of the
    intermediary system tends to bring prices down to the lowest
    level   at   which   sufficient   capacity   is   available.
    Consequently, as has currently happened in the property

catastrophe market, when underwriters withdraw from markets, premium rates can move quite sharply and in parallel. Analogies can be drawn between the pricing mechanism of the London market and of Wall Street, both of which depend on the laws of supply and demand and are fiercely price competitive, but charge similar prices for similar products.

London has historically built its success on being a market of last resort as well as being a market which provides innovative covers. This success has arisen from a blend of the skills of the intermediary with those of the underwriter. The separation of the two different organisations, together with the specialist nature of many underwriters, has encouraged this.

One of the historic strengths of the London Market has also been the fact that an underwriter has relatively low fixed overheads and does not have to support a marketing department and can always refuse a risk rather than write to cover substantial fixed costs. The rising overhead costs of broking operations, however, has tended to increase the fixed costs of the brokers and this has put pressure on the market. This is acting to depress innovation and has cut back on necessary research and development. This is one of the challenges that the market has to overcome in the 1990's.
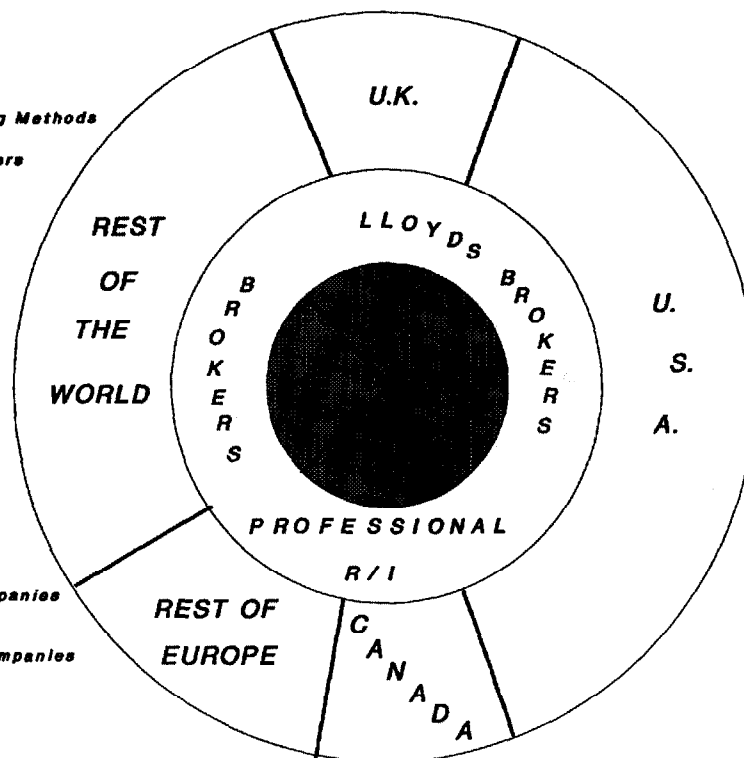
SCHEMATIC DIAGRAM OF THE LONDON MARKET

Legend

Outer Ring = Sources

Middle Ring = Marketing Methods

Inner Ring = Underwriters

Underwriters

A = Foreign owned companies

B = U.K. Companies

C = Professional R/I Companies

D = U/W Agencies

E = Lloyds

U.K.

REST OF THE WORLD

U. S. A.

REST OF EUROPE

CANADA

LLOYDS

BROKERS

BROKERS

PROFESSIONAL R/I

A B C D E

Lloyd's of London

Lloyd's is a society incorporated by Act of Parliament in 1871. It provides a market place and a framework for regulations. Its members, known as Names, underwrite insurance risks. The underwriting is carried out on behalf of a group of Names by an underwriter appointed by a Managing Agent. This group of Names is called a Syndicate.

Names have to show minimum levels of wealth, currently £250,000. They must also deposit sums with Lloyd's, usually 30% of premium limits and also accept unlimited personal liability. There is a limited stop loss market available. Each Name is responsible for his losses to the full extent of his wealth. In certain cases, Lloyd's has taken losses to the Central Fund rather than look to individual Names. In any event, the Central Fund is available to meet the liabilities arising on any Syndicate that fails to meet its liabilities. The Council has the right to augment the Central Fund by levies on existing Names. There are thus very considerable reserves backing a Lloyd's policy.

Members' agents represent Names and manage their affairs within Lloyd's. Each Name typically participates in a number of Syndicates and a major role of members' agents is ensuring a spread of risk appropriate for his Names. The role has analogies with the role of a stock broker advising his client on a suitable portfolio mix. Members' agents are in a sense the suppliers of capacity to the market and can withdraw capacity from a syndicate if the syndicate fails to perform.

Underwriting agents write business on behalf of Syndicates.

At the present time, a member's agent and underwriting agent can be part of the same organisation. However, there has been some suggestion that this procedure should be banned, as was the case with ownership of underwriting agents by Brokers.

With some few exceptions, all business in and out of Lloyd's

must pass through Lloyd's Brokers, even if the Broker's principal has negotiated directly with the underwriters. A Lloyd's Broker must pass solvency tests and comply with Lloyd's regulations. Lloyd's Brokers also perform important accounting functions.

Lloyd's capacity for 1992 has been estimated to be US$20 billion at current exchange rates and reflects an increase of some US$700 million over 1991/1990. Although capacity increased, the number of Names reduced from around 28,500 to around 26,500. The average premium limit per Name increased to £385,000 from £350,000 in 1990 and compares with £251,000 for resigning Names. Thus, although there has been some adverse comment in the US about the reduction in the number of Names, the authors believe that in fact this trend is a healthy one. The resigning Names tend to be those with less wealth who entered the market in the 1970's when entrance requirements were eased and probably do not have as much capacity to take the necessary risks required.

Institute of London Underwriters

The Institute of London Underwriters (ILU) is a body which represents most of the insurance companies writing marine insurance in the London Market. The ILU provides services to its members which are similar to those provided by Lloyd's to Syndicates and, as at Lloyd's, most business is written in one building.

ILU has over 100 member companies. Each application of a potential member is carefully studied and each member is subject to stringent solvency requirements. Parents of member companies have to give guarantees in respect of subsidiaries. No ILU company has ever defaulted on its obligations.

In the London Market, insuring entities tend to insure a small portion of large risks. ILU has a certain number of officials who issue and sign policies on behalf of members subscribing to the particular insurance. These policies work on a coinsurance basis and each underwriter is responsible for the share of the risk he has accepted. The ILU also arranges settlement of claims and premiums. Because of the settlement procedures and the security vetting of membership, the ILU is highly regarded and non-members of the ILU find themselves at a material disadvantage when writing marine business in London. Together with Lloyd's, ILU members control the vast majority of marine business in London.

Policy Signing & Accounting Ltd

The nearest non-marine counterpart of the ILU is Policy Signing & Accounting Ltd. However, this body only provides a clearing function and does not provide or require any solvency guarantees from members.

2. Types of Business

All types of business are written in the London Market. Traditionally, London has taken a more entrepreneurial approach than other markets and has tended to be prepared to write business that other markets are not chasing. This approach has tended to lead to more stable results overall, as underwriters have been able to stop writing lines at times when profitability was low and therefore avoid the worst of the troughs of the underwriting cycle.

Much business is written through line slips or binding authorities where underwriting authority is delegated, subject to guidelines. This is significant as it allows London to participate in mass risks, for example motor business, in many parts of the world, without incurring heavy costs. No figures are readily available for the amount of business written in this way and it varies according to underwriting syndicates.

The principal classes of business in the London Market are:

Marine Business is broadly defined and includes hull, cargo, third party liability of shipowners, war risks, inland cargo, oil rigs and satellites. Marine business was the original business of the London Market. Marine Syndicates also write some non-marine business known as incidental non-marine.

Non-marine Business is mainly property and casualty risks. These include fire and natural hazards risks, professional indemnity, fidelity risks, personal accident, public liability and bloodstock risks. The basis of subdivision varies quite widely, but the Non-Marine business is normally further split into short-tail and all other business, which has recently been further sub-divided into other groups, according to the length of the tail.

Aviation Business includes aircraft hull and cargo, airline liability and satellites. Thus, satellite insurance is an overlap between aviation and marine business.

Motor Business There are also a number of Syndicates specialising in motor (automobile) insurance, mainly in the UK Market.

These divisions do not constitute absolute groups of risks as certain risks could be classified in one or other class.

3. Methods of Placing Business

A distinctive feature of the London Market is the fact that the insurance business is generally placed by means of the slip system. The slip has a standard form and contains terms and conditions and other particulars of insurance. The broker prepares the slip and then discusses it with one underwriter, known as the leading underwriter. The broker and the lead underwriter agree the terms and rates among themselves. The lead underwriter, if he accepts the risk, stamps the slip indicating his share of the risk. The broker then goes to other underwriters, known as following underwriters, to place the balance of the risk. The total acceptance can exceed 100%, in which case the signed lines are scaled down. If the total is less than 100%, then either part of the risk remains unplaced and must be borne by the insured or the broker attempts to renegotiate.

An example of a Lloyd's slip is shown in Appendix 1.

As the business is placed by a broker personally, the process can be time consuming. Lloyd's is located in one building, as are ILU members and this reduces the work involved in placing a risk. Other locations attract US specialists in particular markets, for example aviation and casualty.

4.   Accounting

A particular feature of the London Market is the funded
accounting convention. Its origins lie in Lloyd's, and it may
best be described by considering how it is used at Lloyd's.

At Lloyd's, a group of individuals agree to write business as
a syndicate. The business is written on their behalf by an
underwriter over calendar year 1987, say. This group of
individuals is a single entity separate from the group of
individuals for whom business is written in 1988, although
there will be considerable overlap.

A fund is established for the 1987 members, which consists of
premiums received less claims paid. At the end of 1987, the
adequacy of this fund is tested. If there is a deficiency,
the members are called on to fund the deficiency. However,
profits, if any, are not distributed. This review of the fund
is repeated as at the end of 1988.

During 1990, the position as at end 1989 is reviewed and any
profit/(loss) in the fund is then distributed to/(called from)
members. This represents the end of their involvement in the
1987 underwriting year. There are, however, likely to be
unpaid claims at this stage, and a premium for this ongoing
liability is calculated and paid to the members of the 1988
underwriting year before any profit distribution to the 1987
Members.

This premium is called the Reinsurance to Close or RITC.

One of the important features of this accounting convention is
that, whereas no profits are distributed in the first three
years, losses are recognised immediately. There is also no
calculation of an unearned premium reserve. The convention is
particularly suited to the business written in London which is
often of a very long tailed nature - sometimes less than 1% of
ultimate losses have been reported at the end of an
underwriting year.

Methods used in testing the adequacy of the fund vary and different conventions can be used by, for example, a Lloyd's Syndicate and a London Market company. Sometimes, expenses are deducted from the fund and the balance compared with reserves on booked business. Other times, expenses are not deducted. The balance of the fund can be compared with either discounted or undiscounted reserves.

Funding can also be carried out on an ultimate basis. In this case, premiums and claims are projected to ultimate. If an ultimate loss is projected, the fund is increased to cover the loss.

The estimation of the reinsurance to close of a Syndicate's year of account is required to be fair to both incoming and outgoing Names. In addition, there are certain minimum solvency requirements to be met and, while the RITC is usually greater than or equal to this amount, it is not necessarily the case. If it is not, then the Names are required to inject additional funds for solvency purposes, though, of course, they remain their property. The approach is similar to Schedule P concerning penalty reserves.

Companies in the London Market also produce returns prepared in compliance with the Companies Acts and returns for the Department of Trade and Industry, the insurance supervisory body.

Most underwriters subscribe to one of three accounting services, namely the Lloyd's Policy Signing Office (LPSO), the Institute of London Underwriters (ILU) or the Policy Signing and Accounts Centre (PSAC). These bodies essentially simplify settlement procedures for the various parts of the market. While they often provide statistical information, it is usually inadequate for actuarial purposes and companies need to develop extra data.

These agencies perform work required by all participants centrally such as the collation of substantial information.

The data available to London Market writers will depend to a large extent on what the bureau provide and the manner in which they provide it.

5.   Role of the Actuary

At the end of 1990, the London Market had around 70 casualty
actuaries. This represents a substantial growth as there were
only a handful of casualty actuaries working in the London
Market in 1980 and they were mainly employed by consultancy
firms. While consultancy practices have expanded rapidly, the
growth in the employment of non-consultants has been even more
rapid.   Most actuaries working in the London market are
Fellows of either the Institute of Actuaries (London) or the
Faculty of Actuaries (Edinburgh).   The members of both of
these bodies are actuaries practising in life, pensions or
property/liability. A conference of actuaries practising in
property/casualty, called GIRO, is held in the autumn of each
year.

In the 1970s, actuaries, with one or two exceptions, were
largely perceived as being life or pensions orientated with
little to contribute in the property/liability field, other
than some involvement in motor business in the very large
companies. In the early 1980s, more actuaries became involved
in the market as difficulties arose on longer-tail development
on casualty losses and the emergence of asbestos related
claims.

Initially, the role of the actuary was in the reserving area
and this is probably still the most important activity.
Technically, a Lloyd's syndicate does not have any reserves,
only a reinsurance premium to close. However, all the
techniques in the actuarial assessment of the reinsurance
premium are essentially the same as for reserving.

Following on from the reserving activities, there has been an
increasing involvement in rating. However, the constraints of
the slip system complicate the logistics of the actuarial
rôle. It is clearly impractical for each syndicate to have an
actuary look at each risk. Some actuarial work is undertaken
in-house by the underwriter, sometimes on his own behalf,

sometimes on behalf of others on the slip. Often the broker will arrange for an actuarial report to be carried out and for this report to be circulated as part of the placing information. This is common with a lot of US medical malpractice risks, for example.

Actuaries are also increasingly being asked to devise rating guidelines and possible likely rates for specific types of risk, for example high layer catastrophes.

As much of the financial planning is currently carried out at the syndicate rather than agency level, there is less complexity and hence less need for actuaries in this area. However, financial planning is an area that could be expected to expand as syndicates and many managing agents become larger. There has certainly been a change of emphasis, as the actuaries are now consulted on a much wider range of issues. Until the early 1980's, the underwriter would have made all the financial decisions and, in the vast majority of cases, without recourse to any form of actuarial advice.

6.   General Considerations in Loss Reserving

In all loss reserving estimation procedures, it is essential to understand the contracts to which the losses relate, the nature of the business written and the data available. This is of the utmost importance in the London Market, where not only may the business written be highly complex, but changes over time may have substantially altered the portfolio mix.

The methods most often used consider paid and incurred loss development, either using the traditional loss development or curve fitting techniques. The use of the paid and incurred Bornhuetter-Ferguson methods is also common.

Because of the way business is placed, and the type of business written, the concept of a claim count is often inappropriate. Average claim size and frequency methods are usually not used. To take an example, if a syndicate writes excess reinsurance of a large number of US primary writers, the data available to it will be paid and incurred losses classified by cedant. To count each contract for which losses have been notified as one claim ignores the fact that these losses may relate to any number of underlying claims. It also ignores the fact that the syndicate may have participated in different layers of the same cedant's protection. Worse still, if the contract is subject to an aggregate deductible, then the underlying claims cannot, even in theory, be counted.

For proportional covers, where at least in principle the underlying claims could be counted, this data will usually be unobtainable, unless the Broker makes a special effort to obtain it from the reinsured, which he will only do if there is a problem in placing business.

Any attempt to test changes in rating levels by dividing premium income by numbers of risks should be treated with

great care. If the underwriting policy has been to improve the portfolio by rejecting half the risks presented and taking a greater share of risks not rejected, this calculation will show an increase in average rates which may not be reflective of actual rating changes. It is also distorted by other factors, such as changes in exposure or underlying rate adequacies.

As discussed later, it is important to understand the data provided. If this has been converted to Sterling, it is important to understand how. If the reinsurance programme is subject to outwards reinstatements, it is important to understand whether these have been treated as claim payments or negative premiums. The treatment of non recoverable reinsurance payments and outstanding losses needs to be understood.

As with all loss reserving exercises, data should be divided into homogeneous subgroups. Often, this will involve the three main accounting currencies (US Dollars, Canadian Dollars and Sterling), each split into major categories of business. Some of these may require further subdivision, particularly where reinsurance business is involved. For example, US General Liability business might be split into proportional and non-proportional subclasses. Non-proportional business may be further subdivided into working layer, high layer and aggregate. In practice, the numbers of classes analysed is quite large; thirty classes for one company would not be exceptional. Because of the necessary subdivision and, often also because of the type of business involved, development factors are erratic. Appendix 2 shows an example of such an erratic development for US professional indemnity business. It should also be noted that even with such a large number of classes, the data may be more heterogeneous than the average US actuary contracts.

It is important to understand changes in the account and an example based on a portfolio of contracts subject to aggregate limits and deductibles may serve to illustrate the importance

of understanding the changes that can occur in the account and in the market.

A contract which is subject to an aggregate deductible is not triggered until incurred losses to the cedant exceed a specified aggregate amount. The definition of this aggregate can vary. A portfolio of such contracts may show little or no development for some time while underlying aggregates are being eroded.

A contract which is subject to an aggregate limit, rather than a deductible, has total cover limited to the aggregate. Development therefore ceases when the aggregate limit is exhausted.

Contracts may be subject to both aggregate deductibles and limits and those aggregates may apply to some or all of the coverages provided.

Appendix 3 provides an example showing the effect of the inclusion of aggregate deductibles.

Development for years with aggregate deductibles is higher than for prior years, and results projected on the basis of simple averages, for example, would be understated. While the effect is strikingly clear in the example shown, in practice the underlying change in development may not be apparent from the data and only an understanding of changes in terms and conditions will avoid distorted estimates.

Terms and conditions will change for a number of reasons, one of which is a hardening or softening of the market. These market changes can not only cause changes in expected loss ratios, but also change loss development patterns. A sound knowledge of market changes can alert the actuary to potential changes in the business being reviewed.

7.   Data Availability

The data available to the actuary working in the London Market
is sometimes of poor quality. It can often be difficult to
know what the underlying business is and how it has changed
through the years. Some classes of business are very broadly
defined and data subdivided by major type of business may not
be available. For example, all business denominated in US
Dollars may be treated as one class. The effect of
significant changes in business, or changes in type of
coverage, may therefore be difficult to project.

Data maintained on manual systems can lead to problems in
collation. It can often be very difficult to adjust data
produced by manual systems for distorting influences, such as
latent disease development or the inclusion of non-
recoverables in net data.

It is also not unknown for data produced after a change in
system to be prepared on a different basis. This has the
result that historic development prior to the change does not
relate to the new data classifications.

Allocation of reinsurance recoverables can distort development
statistics, particularly where the recoverables relate to a
major loss to which different underwriting years have
exposure.

As described later, the treatment of currency conversion in
the statistics varies and the data denominated in the original
currency is sometimes not available.

Because of the type of business written, and also the manner
in which it is written, some data which would be useful in
assessing rate changes, such as changes in underlying exposure
in contracts subject to deductibles, cannot be obtained.
Changing the underwriter can lead to changes in the portfolio
which are difficult to quantify. For example, the new

underwriter may continue to write the same proportion of Hull, Cargo and Marine liability, but reject or change his participation in renewals. The future development may differ from historic development without being readily quantifiable for some time.

It is also worth noting that in some classes of business, market practice is not to record outstandings for at least the first two years. There are differences in practice and some companies may never record outstandings.

Reinsurance programmes are often subject to reinstatement premiums. These can be included in the data either as negative premiums or positive claim payments. Inwards business may also be subject to reinstatement and these are always included in gross premium data and occasionally cannot be separately identified.

Some companies and syndicates write business which has exposure to significant gross losses, much of which is ceded to reinsurers. The retention on a £10 million gross loss could be as low as £50,000. The cost of reinstating the programme might be as much as £2 million. How and where the cost is included in the data are important questions.

Also, when the account contains latent diseases, the information on the claims is often very poor. Firstly, because it relates to very old policies, and secondly, because it is reinsurance business.

Benchmark patterns based on data compiled by the Reinsurance Association of America (RAA) are often used for US business written in London. They are clearly inappropriate for non-US business. Given the likely differences between the RAA data and the account being reviewed, and also the nature of the RAA data, such a benchmark pattern should be used with caution. Most loss statistics in the London Market are maintained on an underwriting year basis and an adjustment is required for benchmark data which relates to accident year basis. Data

published by ISO and Best's can also serve as a basis for useful benchmark patterns for US business. The ROA has commenced putting together data which can help with non-US business though it is based on very heterogeneous data. Which benchmark pattern is most appropriate will depend on the type of business being reviewed.

8. Currency

The business written in the London Market is usually accounted for in three different currencies: US Dollar, Canadian Dollar and Sterling; the last of which also includes business written all other currencies and is often called Sterling and Convertible Sterling.

Because the UK and US social, legal and insurance environments are different, it is essential to project these accounts separately.

Generally, the Sterling account develops faster than the North American accounts though some US business can be accounted in Sterling. The Canadian currency account is often relatively small. Generally, Canadian losses tend to develop somewhat faster than US losses.

Because exchange rates can fluctuate significantly over time, it is important to project losses using data which is accounted in either the original currency or converted at current exchange rates. Failure to do this will lead to distorted results, as illustrated in Appendix 4.

The triangle also illustrates the need to hold assets matched to liabilities.

It is important, when given data for Non-Sterling business which has been converted, to understand the way in which the data has been converted. There are at least three possibilities; current exchange rates; transaction exchange rates; or rates which remain constant for all data relating to a particular underwriting year, but which vary by underwriting year.

Some currency problems arise because of the nature of the business written and are difficult to eliminate. For example, the premium for a Marine policy covering a US shipping company would be paid for in US dollars. Claims arising from a vessel covered by this policy could occur in many different ports in the world and be settled in local currencies. The amounts would be included in the US dollar class converted at transaction exchange value. In this case, treating US dollar business separately does not entirely eliminate the effect of currency fluctuation from the data. The theoretically correct approach is somewhat complex and worth of a paper in its own right.

Reinsurance contracts, covering losses which can be denominated in different currencies, often specify contract rates of exchange. The contract may specify that sterling losses are to be converted at £1 = US$2 for example. These exchange rates are fixed and may differ significantly from actual exchange rates.

9. LMX Business

As already stated, the London Market comprises Lloyd's syndicates and London Market companies which write worldwide primary and reinsurance business. The outwards reinsurance of any one of these entities is placed largely with London Market specialist companies or Syndicates. These in turn place their reinsurance back into the market.

This last reinsurance, the protection of reinsurance of London Market reinsurers, is known as London Market Excess of Loss or LMX business.

Losses to the LMX market fall broadly into two categories: Attritional losses and Spiral losses.

Attritional losses are small losses which do not exceed the applicable retentions significantly, if at all. In a property account, such losses would normally develop quickly.

Spiral losses are major catastrophes such as the 1983 Winter Freeze or Hurricane Hugo. These losses reach high layers of the reinsurance programme. Because of the nature of the LMX market, these losses continue to develop long after the underlying claim has been fully settled.

To take an example, when the gross loss relating to Hurricane Hugo of LMX Writer A reaches a layer of his outwards programme, he notifies each of the participants on that layer. This increases the gross loss to those LMX companies and they in turn notify their reinsurers. These reinsurers then notify the participants in their programmes, one of whom may happen to be writer A. This example uses a Property LMX loss and much of this section uses features of such an account to illustrate the problems in reserving for an LMX account.

The spiral results partly from syndicates and companies, in effect, participating in their own reinsurance protections and

also because of the many participants who lie between the original insured and a writer of this business. It is by no means unique to London. Any company writing retrocessional business can experience this type of development, though the effect in London is probably more pronounced because of the concentrations of underwriters.

There are a number of factors which reduce the spiral effect. The first of these is what is known as co-insurance, although strictly speaking, it is self retention. Excess layers are often written on the basis that 5%, for example, of the losses to the layer are retained by the cedant. The effect is that only 95% of the losses are passed between cedant and reinsurer. The losses are therefore successively diminished at each stage.

Secondly, some LMX business is passed out of the market because of participation in reinsurance programs by companies who do not protect themselves back into the LMX market.

A third factor, which reduces the spiral effect, is the exhaustion of reinsurance programmes. When losses to LMX writer A relating to Hurricane Hugo reach the top of his outwards programme, any further gross development stays with writer A and does not pass on to other participants.

Despite these factors, development can continue for a long period, particularly when compared to the development of the underlying losses. For example, insurance claims as a result of Hurricane Alicia, which occurred in August 1983, have long been settled. Incurred LMX losses relating to Hurricane Alicia, however, continue to develop. It should be noted that past losses are not necessarily a good guide to the future because of shifts in the structure of the Market and retrocessional programmes. Hugo is developing in a very different way to Alicia.

Appendix 5 contains a simplified model which illustrates some of these features. The model is based on a model included in

a paper presented to the 1988 GIRO conference.

In this model, the market is considered as a single entity
with one reinsurance programme. In the base scenario a loss
which exceeds the retention, cycles around the market, and at
each stage gross losses increase as excess losses are returned
to the market. Ultimately, the gross loss to the market is
about seven times the insured loss. The gross loss reaches
90% of its ultimate value after about thirty periods.

In the second scenario with the same inwards loss, but 15% co-
insurance, the ultimate gross loss is about three times the
inwards loss and it takes only fourteen periods to reach 90%
of ultimate.

The third scenario illustrates the development of a major
market loss considerably in excess of the programme. This
loss is fully developed at period two.

It is important to understand the distinction between the
gross amount paid out of the market to original insureds or
reinsureds and the total of all gross claims paid by
participating in the market. A simplified example may
illustrate the distinction. In this example, the market
consists of two participants. Participant A provides US$1
million cover to an insured outside the market and protects
himself by a 50% quota share protection with participant B.
A total loss results in the market paying US$1 million to the
original insured. The total gross loss to the market is
however US$1.5 million.

Gross losses to the market can therefore exceed, sometimes
considerably, gross insured losses. It is dangerous to
attempt to estimate the company's or syndicate's share of the
market and apply that to the insured loss.

Reserving LMX business presents particular problems.
Development of gross incurred losses differs by underwriting
year depending on the presence or absence of catastrophe

losses. Catastrophes also affect net development, because of co-insurance and because of the exhaustion of reinsurance programmes.

Even excluding catastrophe losses from the data and attempting to address catastrophe and attritional losses separately does not entirely simplify matters. To understand why, it is necessary to understand the type of cover provided by LMX writers. Cover is typically a participation in excess layers If there is one catastrophe in an underwriting year, which exhausts all cover provided, there will be no attritional losses incurred in that year and therefore no attritional development. If there is no catastrophe, then there is potential for attritional losses and therefore potential for attritional development.

In other words, the development of attritional losses depends on the presence or absence of catastrophe losses. When projecting attritional losses based on historic paid and incurred loss development, it is important to realise that development for the year being projected may be slower than that indicated by historic data purely because the year is catastrophe free.

In projecting attritional losses, net of reinsurance, the effect of changing retentions also needs to be considered. Retentions depend very much on market conditions and a softening market may lead to a change in the excess point from £200,000 to £20,000, say. This significantly reduces case type development on known losses and shortens development patterns.

When reserving for spiral losses, the features of the spiral discussed above should be borne in mind. Gross development will, for example, depend on market conditions such as co-insurance, retention levels and size of programmes. It will also depend on the size of the loss. Major catastrophes, for example, can develop quickly. Of particular importance is the aggregate cover provided by the reinsurer to cedants. This

effectively limits the potential for future development. An analysis of aggregates split by territory and type of cover, front end, back up, whole account, specific and excess on excess is often valuable. It may be possible to estimate gross losses by assuming certain percentage losses of these aggregates. A guide to selecting these percentages may be the corresponding costs in the past of similar catastrophes. Changes in exposure and market conditions, however, can have great significance and the effect may be difficult to quantify. The actuary should therefore exercise considerable caution when carrying out such calculations.

A list of all cedants who have notified losses because of the catastrophe can be of assistance, particularly if this includes dates of notification, layer and excess point. It is often equally valuable to examine the cedants who have exposure periods which include the loss date, but who have not yet notified losses.

It is worth bearing in mind that a loss such as the Australian Bush Fire, which is not a Marine loss, may emerge on a Marine syndicate through its incidental Non-Marine writings. This loss will first exhaust Non-Marine specific protection before reaching the whole account protection, which may have been the only involvement with that cedant. It can be dangerous therefore to say that the loss is a Non-Marine loss and that the cedant has in any case not notified an involvement.

It is difficult or, especially if the catastrophe is recent, sometimes impossible, to estimate gross losses. The impact of reinsurance may, however, reduce the significance of this uncertainty, particularly if the programme has been well designed and fully placed.

10. Latent Diseases and Pollution Losses

Starting in the late 1970's, the London market suffered losses
related to various latent diseases and the enactment of
environmental legislation.   The main causes of loss are
asbestos and environmental pollution.   There are many others,
such as DES, Agent Orange and deafness claims related to the
US Federal Employers Liability Act.

These latent diseases claims emanate principally from the
North American market.   The effect on the London Market is
probably exacerbated by the fact that many of the claims enter
the London Market by way of reinsurance.   This limits the data
available.   For example, it may be difficult to aggregate
exposure to one particular asbestos insured.   Delays are
likely to be longer in the London Market, as losses work their
way through underlying layers of insurance and reinsurance.
Equally, the type of claim reaching the London Market may well
differ significantly from those affecting the North American
market, for example the London Market may have greater
exposure to asbestos losses and will continue to develop long
after the US primary insurers are seeing little development in
their net accounts.

The liabilities in respect of these claims are substantial and
highly uncertain, given that they are often subject to
coverage and other disputes, particularly as regards asbestos
and pollution related claims.

Many London Market writers use rules of thumb such as
multipliers applied to incurred or outstanding losses or
reserve using percentages of identified possible maximum
losses.

As these kind of losses are atypical of the account in
general, they should be removed from the statistics and
projected separately.   These claims should ideally be removed
from the date of first notification.   This is not always

possible as the identification of latent coded claims is likely to have started some time after the first date of notification. If this is the case, removing the coded latent claims will produce a downward development from the first year of the coding. Appendix 6 shows an example. Problems can also arise because of aggregate limits on policy. If, for example, an insured has exhausted the aggregate limit because of asbestos and non-asbestos losses, it can be difficult to determine how much of the incurred to date to remove from the data as being asbestos related.

Factors affecting development are the identification of the latent disease in the population; the enactment of legislation which results in potential claims, for example the EPA legislation; the settlement of coverage; and other disputes. All of these are calendar year events which affect development across many underwriting years. Latent claims therefore do not usually show development across evaluation periods, but across calendar year periods. The resulting change in incurred data is illustrated in Appendix 7.

There is no one reserving method appropriate for claims related to these different loss causes. In some cases the uncertainty as to coverage and extent of potential underlying insured loss is so great that there may be no method.

The actuary needs to understand the nature of the underlying loss and the unresolved problems, such as whether coverage exists and how losses may be allocated between insured and insurer. Secondly, he needs to understand the nature of the contracts to which these claims are associated. Important features can be self-insured retentions, aggregate limits and whether the business is reinsurance or direct. Thirdly, the possible limiting effect of outwards reinsurance needs to be considered.

Historical development can be useful. For example, if claims related to a particular type of loss have not moved significantly in the last few years, an understanding of why

this is so may lead the actuary to conclude that this cause of loss no longer presents a problem.

It may in some cases be possible to take a view as to what a prudent reserve might be, bearing in mind the uncertainties. It may in other cases be possible to quantify uncertainties by modelling the underlying losses. Often, however, particularly when the loss is of recent origin, uncertainties are such that no meaningful estimate of ultimate losses is possible and the best service the actuary can perform is to recommend data which should be compiled now and which, when uncertainties are resolved, will be valuable in loss estimation.

11. **Problem Contracts**

A portfolio may contain contracts for which the development is likely to be different from the balance of the account. This may be because of differences in coverage, insolvency of the cedent, poor underwriting, or because they represent a disproportionate part of the account. It may also simply be because the underwriter has highlighted these as being problem contracts which he would like analysed separately. These may need to be removed from the main statistics and treated separately.

Where contracts have been treated separately simply because they form a disproportionate part of the portfolio, it may be sufficient to examine contract wordings and any specific reinsurance protection and to apply benchmark patterns to the data. Sometimes, particularly where the contract relates to a quota share protection of a large account or participation in an agency pool, it may be possible to derive development patterns from the loss data.

In other cases where, because of insolvency, there have been delays in notification, the appropriate action may be to apply either benchmark patterns or patterns derived from the balance of the account, suitably lagged.

Occasionally, contracts are separately identified because of a disproportionate increase in notifications which is seen as a cause for concern. Examination of claims related to the contract together with the terms and conditions of the contract can be of assistance. It is not unknown for administrators of insolvent companies to send copies of claims notifications to reinsurers without an examination of periods of cover or policy exclusions.

In the past, some syndicates and companies wrote unlimited run off covers protecting old years of account of other London

Market participants. The writers of these protections may find that their account contains exposure to asbestos and pollution claims for underwriting years which predate their earliest year of writing. Information is likely to be limited and details of exposure and triangulations of losses may not be available. The contract may also be in dispute. The main problem is likely to be the quantification of asbestos and pollution losses.

12. Discounting

UK companies are allowed to discount claims reserves for the value of future investment income. At this stage, many do so especially for US casualty and long-tail excess of loss business.

Lloyd's does not allow discounting, but financial reinsurance, colloquially known as time and distance, is currently allowed, subject to disclosure to Names, and is frequently used. The rationale is that this practice allows an objective view of the discount rate to be taken. It is possible that these rules will be changed in the future.

There is no specific requirement for an actuary to be involved in the calculation of discounted claim reserves. Indeed, in many cases, discounting plans will have been put together without any form of actuarial input and may sometimes be somewhat rough and ready. At the current time, there is no requirement to discount claims reserves for tax purposes, either in the London market or elsewhere, although there have been rumours from time to time that the Inland Revenue are unhappy with this situation. The accounting rules, other than those of Lloyd's, allow freedom in this direction, although it would be normal for a company that is discounting to disclose that fact. Implicit discounting had been common many years ago, but has now been virtually eliminated and is not well regarded either by auditors or the DTI. Some claims reserves, while undiscounted, may make no allowance for unallocated claims expenses. In these cases future investment income is implicitly assumed to be adequate to meet unallocated expenses.

APPENDIX 1

EXAMPLE OF A LLOYD'S SLIP

Source: A sketch history, Lloyd's of London

TYPE:	CARGO.
FORM:	S.G. Slip policy.
ASSURED:	Jessop Marine Recoveries Ltd., and its associated companies (Wharton Williams Ltd. - Offshore Supply Association Ltd., and Racal Decca Survey Ltd., and/or British and/or USSR Government Authorities for their respective rights and interests.
PER:	Salvage craft "STEPHANITURN" and/or conveyances.
VOYAGE/INTEREST:	Salvage of gold bars in sunken vessel HMS "EDINBURGH" in Barents Sea and delivered part to Murmansk and part to Aberdeen (via Murmansk). Including storage if required.
LIMIT:	£75,000,000 in all.
BASIS OF VALUATION:	Premium payable on the daily amounts receipted calculated at the mean of the London a.m. and p.m. Gold fixings that day. Amount of claim payable calculated on the mean of the London a.m. and p.m. Gold fixings on day of loss.
CONDITIONS:	Subject to:- Institute Cargo Clauses (All Risks) CL80 1.1.63 as far as applicable including War. Strikes, Riots and Civil Commotions as per Institute Clauses. Notwithstanding anything contained in the Institute Clauses referred to herein to the contrary this insurance attaches from the time the interest insured is landed on board the salvage craft and such interest has been receipted by officials on board vessel and continues until such time as the interest insured is delivered as follows:- 1) USSR interest: free alongside vessel Murmansk. 2) British Government;interest free alongside vessel Aberdeen. 3) Salvors interest: to Aberdeen and 10 days after arrival security to be approved by underwriters prior to discharge.

	Subject approval of security for stowage on vessel.
PREMIUM:	Payable on total value of actual amount of gold bars salved rate - T.B.A. Additional storage or alteration in voyage held covered at rates to be agreed. Daily accumulation of gold bars salved to be advised to underwriters.
INFORMATION:	(Not a limit or warranty). As held in the offices of Colburn, French and Kneen.
ADMIN:	All amendments, A.P.'s, R.P.'s, increases not above written lines to be agreed by two leading underwriters only and such agreement to be binding on all other underwriters.

ILLUSTRATION OF INCURRED LOSS DEVELOPMENT

Exhibit 2.1 provides an example of a cumulative incurred loss
development triangle. Data has been classified as US Dollar
professional indemnity business. The development is erratic and
selection of loss development factors based solely on the data is
difficult. For this reason, benchmark patterns are often used,
especially in selecting tail factors. The appropriateness of the
patterns can be tested by comparing implied report-to-report
factors with actual development.

It is always important to understand the content of the account and
the extent to which this has changed through the years. Erratic
development such as that shown in Exhibit 2.1 may conceal changes
in loss development patterns which would be clear in a more stable
account. Discussions with underwriters and knowledge of market
changes become particularly important in this case.

Subsequent Appendices discuss factors which can distort loss
development. The distortions will be clear in the triangles shown.
The reader should bear in mind that in practice these significant
distortions may not be apparent in the data being analysed.

Note that the data used in this example are fictitious.

EXHIBIT 2.1

Illustration of Incurred
Loss Development
As at 12/31/90
in 000's

US Professional Indemnity
Cumulative Incurred Losses

U/W Year	Evaluation Month						
	12	24	36	48	60	72	84
1984	0	445	1,324	1,396	1,295	935	1,014
1985	79	638	1,068	1,329	1,562	1,464	
1986	22	641	1,507	1,276	1,315		
1987	22	422	829	953			
1988	431	1,899	2,964				
1989	88	596					
1990	33						

Incurred Losses
Report–to–Report Development Factors
Evaluation Year basis

U/W Year	Evaluation Month					
	24/12	36/24	48/36	60/48	72/60	84/72
1984	----	2.972	1.055	0.927	0.722	1.084
1985	8.125	1.673	1.245	1.175	0.937	
1986	29.000	2.352	0.847	1.031		
1987	19.111	1.965	1.149			
1988	4.410	1.561				
1989	6.750					

ILLUSTRATION OF THE EFFECT OF CHANGE IN TERMS OR CONDITIONS

In this example, a Lloyd's syndicate underwrote products liability coverage of a US manufacturer. The risk was placed with many carriers and the syndicate always wrote a 2% line. Cover was US$75 million in aggregate. The aggregate limit of losses to the syndicate was 2% of this or US$1.5 million.

In each of the underwriting years 1982 through 1984, the manufacturer suffered a US$100 million aggregate loss, which is US$2 million at the syndicate level. Exhibit 3.1 shows the development of these claims. After 84 months, the loss to the syndicate reached US$1.5 million and cover is exhausted. Further gross development is then either retained by the manufacturer or recovered under other protections.

In the hardening market of 1985, terms were changed and the manufacturer was protected US$75 million in aggregate excess of US$25 million in the aggregate. Losses to the syndicate were therefore limited to US$1.5 million, subject to a deductible of US$0.5 million.

The loss experience of the manufacturer did not change. However, it is not until the second year that losses reach the insurance policy. This is also illustrated in Exhibit 3.1, which shows higher development for underwriting years 1985 and subsequent. The loss to the 1985 year is US$953,000 now and since there is US$547,000 remaining cover, development will continue long after month 84. In other words the loss takes longer to reach the syndicate and continues for a longer period.

EXHIBIT 3.1

Illustration of Effect of
Change in Terms and Conditions
As at 12/31/90
in 000's

Aggregate Deductibles

1982	None
1983	None
1984	None
1985	500
1986	500
1987	500
1988	500
1989	500

Aggregate Limits

1982	1,500
1983	1,500
1984	1,500
1985	1,500
1986	1,500
1987	1,500
1988	1,500
1989	1,500

Cumulative Incurred Losses

U/W Year	Evaluation Month								
	12	24	36	48	60	72	84	96	108
1982	350	613	919	1,148	1,321	1,453	1,500	1,500	1,500
1983	350	613	919	1,148	1,321	1,453	1,500	1,500	
1984	350	613	919	1,148	1,321	1,453	1,500		
1985	0	113	419	648	821	953			
1986	0	113	419	648	821				
1987	0	113	419	648					
1988	0	113	419						
1989	0	113							

Report-to-Report Loss Development Factors

U/W Year	Evaluation Month							
	12/24	24/36	36/48	48/60	60/72	72/84	84/96	96/108
1982	1.750	1.500	1.250	1.150	1.100	1.033	1.000	1.000
1983	1.750	1.500	1.250	1.150	1.100	1.033	1.000	
1984	1.750	1.500	1.250	1.150	1.100	1.033		
1985	---	3.722	1.549	1.266	1.161			
1986	---	3.722	1.549	1.266				
1987	---	3.722	1.549					
1988	---	3.722						
1989	---							

When looking at a class of business which contains data from various currencies, it is imperative that the whole triangulation be restated at the exchange rate prevailing at the evaluation date. This avoids distortions in the observed development which are due solely to currency fluctuations.

For example, the following Exhibits consider an account with a US content. The example illustrates only the US content of the account and it is assumed that no development occurs on the incurred losses. Exhibit 4.1, shows the US content in the original currency, the US dollar, and shows no development of incurred losses.

In Exhibit 4.2, the incurred losses of Exhibit 4.1 have been converted at <u>historical</u> exchange rates. These historical exchange rates are shown at the top of Exhibit 4.2. The incurred losses were converted by deriving the amount paid during each calendar year using the payment pattern shown at the top of Exhibit 4.2. Each incremental paid loss was then converted at the historical exchange rate that year and added to cumulative paid losses at historical rates. The outstanding losses at the end of each year were also converted.

Exhibit 4.2 shows the development factors derived from the incurred loss development triangle converted at historical rates. The apparent development is caused solely by the fluctuation in exchange rates. The movement in exchange rates produces development on a calendar year basis; an appreciation of Sterling produces an apparent negative development on a calendar year basis, a depreciation produces an apparent positive development.

In converting data to Sterling, losses should be converted at constant exchange rates for all entries, using the exchange rate at

the valuation date, 31 December 1990 in this case. In that way,
currency distortion is avoided.

Exhibit 4.3 shows the breakdown of the cumulative incurred losses
and historical exchange rate into paid and outstanding losses.

EXHIBIT 4.1

Exchange Rate Movement
Original Statistics in US Dollars
As at 12/31/90
in 000's

Cumulative Incurred Losses

U/W Year	\<————————————Evaluation Month————————————\>					
	12	24	36	48	60	72
1985	100	100	100	100	100	100
1986	120	120	120	120	120	
1987	140	140	140	140		
1988	160	160	160			
1989	180	180				
1990	200					

Incurred Losses
Report-to-Report Development Factors
Evaluation Year basis

U/W Year	\<————————————Evaluation Month————————————\>				
	24/12	36/24	48/36	60/48	72/60
1985	1.000	1.000	1.000	1.000	1.000
1986	1.000	1.000	1.000	1.000	
1987	1.000	1.000	1.000		
1988	1.000	1.000			
1989	1.000				

Incurred Losses
Report-to-Report Development Factors
Calendar Year Basis

U/W Year	\<————————————Calendar Year————————————\>				
	86/85	87/86	88/87	89/88	90/89
1985	1.000	1.000	1.000	1.000	1.000
1986		1.000	1.000	1.000	1.000
1987			1.000	1.000	1.000
1988				1.000	1.000
1989					1.000

EXHIBIT 4.2

Exchange Rate Movement
Original Statistics in US Dollars
at Historical Exchange Rate
As at 12/31/90
in 000's

Currency Exchange rate

12/31/85	1£=	1.45
12/31/86	1£=	1.47
12/31/87	1£=	1.88
12/31/88	1£=	1.81
12/31/89	1£=	1.61
12/31/90	1£=	1.95 * est'ed

Payment Pattern

12	25.0%
24	50.0%
36	65.0%
48	80.0%
60	90.0%
72	100.0%

Cumulative Incurred Losses

U/W Year	Evaluation Month					
	12	24	36	48	60	72
1985	69	68	61	62	63	62
1986	82	68	70	72	70	
1987	74	77	81	76		
1988	88	97	88			
1989	112	97				
1990	103					

Incurred Losses
Report-to-Report Development Factors
Evaluation Year basis

U/W Year	Evaluation Month				
	24/12	36/24	48/36	60/48	72/60
1985	0.990	0.891	1.012	1.022	0.983
1986	0.836	1.018	1.041	0.964	
1987	1.029	1.063	0.935		
1988	1.093	0.910			
1989	0.869				

Incurred Losses
Report-to-Report Development Factors
Calendar Year Basis

U/W Year	Calendar Year				
	86/85	87/86	88/87	89/88	90/89
1985	0.990	0.891	1.012	1.022	0.983
1986		0.836	1.018	1.041	0.964
1987			1.029	1.063	0.935
1988				1.093	0.910
1989					0.869

EXHIBIT 4.3

Exchange Rate Movement
Original Statistics in US Dollars
at Historical Exchange Rate
As at 12/31/90
in 000's

Cumulative Incurred Losses

U/W Year	12	24	36	48	60	72
1985	69	68	61	62	63	62
1986	82	68	70	72	70	
1987	74	77	81	76		
1988	88	97	88			
1989	112	97				
1990	103					

Cumulative Paid Losses

U/W Year	12	24	36	48	60	72
1985	17	34	42	51	57	62
1986	20	36	46	57	64	
1987	19	38	51	62		
1988	22	47	59			
1989	28	51				
1990	26					

Outstanding Losses

U/W Year	12	24	36	48	60	72
1985	52	34	19	11	6	0
1986	61	32	23	15	6	
1987	56	39	30	14		
1988	66	50	29			
1989	84	46				
1990	77					

APPENDIX 5
LMX MODEL

Exhibits 5.1 to 5.3 display the model used to illustrate some features of LMX business. Exhibit 5.1 displays the base scenario. The base model starts with the following assumptions:

Inwards gross loss =   150
Retention   =   100
Limited programme = 1,000
Coinsurance   =   50%

In this scenario, the insured gross loss exceeds the retention and cycles around the market. At each stage gross losses increase as excess losses are returned to the market. Specifically, each column works as follows:

Column

2. Gross Loss

At period 1, the gross loss is the inwards gross reinsurance shown in the assumptions. In subsequent periods, the gross loss is inwards loss plus cumulative loss returned to the market (shown in column 6).

3. Retained Losses Before Coinsurance

The gross losses retained, before coinsurance, come from two sources. First, the amount of loss below the retention, and second the amount of loss, if any, which goes over the top of the reinsurance programme.

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Column

4. Retained Losses by Coinsurance

A percentage of the losses above the retention up to the limit
is retained because of coinsurance. In the base scenario, the
coinsurance percentage is 5% and as losses develop, 5% of the
development is retained because of coinsurance.

5. Retained Losses After Coinsurance

This is the total estimated losses, and is the sum of columns
(3) and (4).

6. Losses Returned to the Market

This is the difference between the gross loss and the part
which is retained, ie column (6) = column (2) - column (5).

The multiplier, which is shown on the last line of the assumptions,
is equal to the ratio of the ultimate gross loss to the original
inwards gross loss.   For example, in the base scenario, the
multiplier equals 6.7 which is equal to 1005/150.

Exhibits 5.2 and 5.3 display two other scenarios, which are the
base scenario, with one of the assumptions changed. In the case of
exhibit 5.2, the coinsurance percentage was fixed at 15%.   The
affect of this is to reduce the multiplier from 6.7 to 2.9 and
reduce the time needed to obtain 90% of the ultimate gross loss to
only 14 periods.

Exhibit 5.3 considers a gross insured loss of 2,000, which exceeds
the limit. It does not "spiral" and it is fully developed after
only two periods.

EXHIBIT 5.1

LMX Spiral
Base Scenario
All amounts are cumulative
in 000's

Assumptions

Inwards Gross Loss	150
Retention	100
Limit of Programme	1,000
Coinsurance	5.0%

Multiplier

6.7

Time Period (1)	Gross Loss (2)	Retained Losses Before Coinsurance (3)	Coinsurance Retention (4)	Total Retained Losses (5)	Losses Returned To the Market (6)
1	150	100	3	103	48
2	198	100	5	105	93
3	243	100	7	107	135
4	285	100	9	109	176
5	326	100	11	111	215
6	365	100	13	113	252
7	402	100	15	115	287
8	437	100	17	117	320
9	470	100	18	118	351
10	501	100	20	120	381
11	531	100	22	122	410
12	560	100	23	123	437
13	587	100	24	124	462
14	612	100	26	126	487
15	637	100	27	127	510
16	660	100	28	128	532
17	682	100	29	129	553
18	703	100	30	130	573
19	723	100	31	131	592
20	742	100	32	132	609
21	759	100	33	133	626
22	776	100	34	134	643
23	793	100	35	135	658
24	808	100	35	135	673
25	823	100	36	136	686
26	836	100	37	137	700
27	850	100	37	137	712
28	862	100	38	138	724
29	874	100	39	139	735
30	885	100	39	139	746
31	896	100	40	140	756
32	906	100	40	140	766
33	916	100	41	141	775
34	925	100	41	141	784
35	934	100	42	142	792
36	942	100	42	142	800
37	950	100	43	143	808
38	958	100	43	143	815
39	965	100	43	143	821
40	971	100	44	144	828
41	978	100	44	144	834
42	984	100	44	144	840
43	990	100	44	144	845
44	995	100	45	145	851
45	1,001	101	45	146	855
46	1,005	105	45	150	855
47	1,005	105	45	150	855

EXHIBIT 5.2

LMX Spiral
Scenario 2
All amounts are cumulative
in 000's

Assumptions

Inwards Gross Loss	150
Retention	100
Limit of Programme	1,000
Coinsurance	15.0%

Multiplier

2.88

Time Period (1)	Gross Loss (2)	Retained Losses Before Coinsurance (3)	Coinsurance Retention (4)	Total Retained Losses (5)	Losses Returned To the Market (6)
1	150	100	8	108	43
2	193	100	14	114	79
3	229	100	19	119	109
4	259	100	24	124	135
5	285	100	28	128	158
6	308	100	31	131	176
7	326	100	34	134	193
8	343	100	36	136	206
9	356	100	38	138	218
10	368	100	40	140	228
11	378	100	42	142	236
12	386	100	43	143	243
13	393	100	44	144	249
14	399	100	45	145	254
15	404	100	46	146	259
16	409	100	46	146	262
17	412	100	47	147	265
18	415	100	47	147	268
19	418	100	48	148	270
20	420	100	48	148	272
21	422	100	48	148	274
22	424	100	49	149	275
23	425	100	49	149	277
24	427	100	49	149	278
25	428	100	49	149	278
26	428	100	49	149	279
27	429	100	49	149	280
28	430	100	49	149	280
29	430	100	50	150	281
30	431	100	50	150	281
31	431	100	50	150	281
32	431	100	50	150	282
33	432	100	50	150	282
34	432	100	50	150	282
35	432	100	50	150	282
36	432	100	50	150	283
37	433	100	50	150	283
38	433	100	50	150	283
39	433	100	50	150	283
40	433	100	50	150	283
41	433	100	50	150	283
42	433	100	50	150	283
43	433	100	50	150	283
44	433	100	50	150	283
45	433	100	50	150	283
46	433	100	50	150	283
47	433	100	50	150	283

EXHIBIT 5.3

LMX Spiral
Scenario 3
All amounts are cumulative
in 000's

Assumptions		Multiplier
Inwards Gross Loss	2,000	1.43
Retention	100	
Limit of Programme	1,000	
Coinsurance	5.0%	

Time Period (1)	Gross Loss (2)	Retained Losses Before Coinsurance (3)	Coinsurance Retention (4)	Total Retained Losses (5)	Losses Returned To the Market (6)
1	2,000	1,100	45	1,145	855
2	2,855	1,955	45	2,000	855
3	2,855	1,955	45	2,000	855
4	2,855	1,955	45	2,000	855
5	2,855	1,955	45	2,000	855
6	2,855	1,955	45	2,000	855
7	2,855	1,955	45	2,000	855
8	2,855	1,955	45	2,000	855
9	2,855	1,955	45	2,000	855
10	2,855	1,955	45	2,000	855
11	2,855	1,955	45	2,000	855
12	2,855	1,955	45	2,000	855
13	2,855	1,955	45	2,000	855
14	2,855	1,955	45	2,000	855
15	2,855	1,955	45	2,000	855
16	2,855	1,955	45	2,000	855
17	2,855	1,955	45	2,000	855
18	2,855	1,955	45	2,000	855
19	2,855	1,955	45	2,000	855
20	2,855	1,955	45	2,000	855
21	2,855	1,955	45	2,000	855
22	2,855	1,955	45	2,000	855
23	2,855	1,955	45	2,000	855
24	2,855	1,955	45	2,000	855
25	2,855	1,955	45	2,000	855
26	2,855	1,955	45	2,000	855
27	2,855	1,955	45	2,000	855
28	2,855	1,955	45	2,000	855
29	2,855	1,955	45	2,000	855
30	2,855	1,955	45	2,000	855
31	2,855	1,955	45	2,000	855
32	2,855	1,955	45	2,000	855
33	2,855	1,955	45	2,000	855
34	2,855	1,955	45	2,000	855
35	2,855	1,955	45	2,000	855
36	2,855	1,955	45	2,000	855
37	2,855	1,955	45	2,000	855
38	2,855	1,955	45	2,000	855
39	2,855	1,955	45	2,000	855
40	2,855	1,955	45	2,000	855
41	2,855	1,955	45	2,000	855
42	2,855	1,955	45	2,000	855
43	2,855	1,955	45	2,000	855
44	2,855	1,955	45	2,000	855
45	2,855	1,955	45	2,000	855
46	2,855	1,955	45	2,000	855
47	2,855	1,955	45	2,000	855

**ILLUSTRATION OF EFFECT OF EXCLUDING CODED HISTORIC
DISEASE CLAIMS FROM WHOLE ACCOUNT**

The following Exhibits consider some distortions that latent claims
can produce to the development of the whole account.

The example considers underwriting years 1970 to 1974, evaluated as
at 31 December 1990. Exhibit 6.1 shows the whole account data
including the latent diseases (top triangle), the observed loss
development (middle triangle) and the reported latent claims
(bottom triangle). Looking at the development factors, it is
apparent that the development on the account was tailing off until
calendar year 1985, when latent claims started to be reported.

As these claims became significant, it was decided that they should
be separately coded. The coding started at the end of 1988.
Exhibit 6.2 shows the whole account statistics excluding the coded
latent claims. As the coding started at the end of 1988, these
claims have only been removed from the last three diagonals.

When the latent disease claims have been excluded from the whole
account statistics (see Exhibit 6.2), the remaining triangle has
the following three characteristics.

First, as the statistics still include latent claims in the years
preceding the coding year, the observed loss development of the
whole account during these years is distorted by these claims. For
example, in Exhibit 6.2, the loss development during calendar years
1985 to 1987 is affected by these remaining latent claims.

Secondly, the development factors during the year of the coding, in
this case 1988, show negative development. The bottom triangle of
Exhibit 6.2 highlights the fact that the development during 1988 is
negative, all factors in the 1988/1989 column are less than one.

Finally, the two diagonals of loss development factors are
undistorted and represent the true development of the whole account
excluding latent diseases.

Therefore, the actuary needs to be aware of when the separate coding of latent diseases losses started, along with the distortions still present in the whole excluding latent diseases triangles.

EXHIBIT 6.1

Illustration of Effect of Excluding Coded
Latent Disease Claims from Whole Account
As at 12/31/90
in 000's

Whole Account
Cumulative Incurred Losses
Including Latent Diseases

U/W Year	132	144	156	168	180	192	204	216	228	240	252
1970	100	105	108	110	112	148	159	195	265	316	331
1971	200	210	216	221	244	256	298	350	401	442	
1972	250	263	270	301	315	343	426	477	513		
1973	220	231	268	273	291	399	426	433			
1974	240	292	305	330	399	416	434				

Report–to–Report Development Factors
Evaluation Year basis

U/W Year	144/132	156/144	168/156	180/168	192/180	204/192	216/204	228/216	240/228	252/240
1970	1.050	1.030	1.020	1.015	1.323	1.075	1.223	1.362	1.191	1.047
1971	1.050	1.030	1.020	1.106	1.050	1.165	1.171	1.146	1.103	
1972	1.050	1.030	1.112	1.047	1.088	1.242	1.121	1.076		
1973	1.050	1.160	1.018	1.068	1.369	1.069	1.015			
1974	1.217	1.043	1.083	1.209	1.044	1.043				

Latent Diseases
Cumulative Incurred Losses

U/W Year	132	144	156	168	180	192	204	216	228	240	252
1970	0	0	0	0	0	35	45	80	150	200	215
1971	0	0	0	0	20	30	70	120	170	210	
1972	0	0	0	25	35	60	140	190	225		
1973	0	0	30	30	45	150	175	180			
1974	0	40	45	65	130	145	160				

EXHIBIT 6.2

Illustration of Effect of Excluding Coded
Latent Disease Claims from Whole Account
As at 12/31/90
in 000's

Whole Account
Cumulative Incurred Losses
Excluding Latent Diseases after coding date

<--Evaluation Month-->

U/W Year	132	144	156	168	180	192	204	216	228	240	252
1970	100	105	108	110	112	148	159	195	115	116	116
1971	200	210	216	221	244	256	298	230	231	232	
1972	250	263	270	301	315	343	286	287	288		
1973	220	231	268	273	291	249	251	253			
1974	240	292	305	330	269	271	274				

Report-to-Report Development Factors
Evaluation Year basis

<--Evaluation Month-->

U/W Year	144/132	156/144	168/156	180/168	192/180	204/192	216/204	228/216	240/228	252/240
1970	1.050	1.030	1.020	1.015	1.323	1.075	1.223	0.592	1.005	1.000
1971	1.050	1.030	1.020	1.106	1.050	1.165	0.769	1.005	1.005	
1972	1.050	1.030	1.112	1.047	1.088	0.833	1.005	1.005		
1973	1.050	1.160	1.018	1.068	0.854	1.010	1.005			
1974	1.217	1.043	1.083	0.815	1.010	1.010				

Report-to-Report Development Factors
Calendar Year Basis

<--Calendar Year-->

U/W Year	81/80	82/81	83/82	84/83	85/84	86/85	87/86	88/87	89/88	90/89
1970	1.050	1.030	1.020	1.015	1.323	1.075	1.223	0.592	1.005	1.000
1971		1.050	1.030	1.020	1.106	1.050	1.165	0.769	1.005	1.005
1972			1.050	1.030	1.112	1.047	1.088	0.833	1.005	1.005
1973				1.050	1.160	1.018	1.068	0.854	1.010	1.005
1974					1.217	1.043	1.083	0.815	1.010	1.010

APPENDIX 7

ILLUSTRATION OF THE EFFECT OF A SETTLEMENT
WITH AN INSURED

In this example, a Lloyd's syndicate provided cover to a US manufacturer, during underwriting years 1980 through 1984. In 1987, employees began to assert that the conditions in which they worked had led to a particular type of injury. In 1988, the manufacturer notified the syndicate of these claims. The contract was subject to an each and every loss deductible and the syndicate argued that this deductible applied to each employee. Because individual employee claims were lower than this deductible it was argued that nothing was recoverable under the policy. It was also argued that, in any case, the exposure periods extended in some cases back to the 1960s and that only a proportion of each individual claim related to the cover provided. The manufacturer disputed these assertions and commenced legal action.

The syndicate considered that there was a likelihood that its case would be lost and booked outstandings. Incurred losses are shown in Exhibit 7.1. In 1989 it reached a settlement with the manufacturer at almost 50% higher than booked incurred losses.

Exhibit 7.1 shows this development, the first triangle of report to report factors shows this on an evaluation year basis. The second triangle shows this on a calendar year basis. It is clear that development is calendar year related and not evaluation year related. While this example is fictitious, it is a feature of many latent disease type claims.

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EXHIBIT 7.1

Illustration of the Effect of a
Settlement with an Insured
As at 12/31/90
in 000's

Latent Diseases Cumulative Incurred Losses

U/W Year	84	96	108	120	132
1980	100	100	100	150	150
1981	80	80	120	120	
1982	120	180	180		
1983	100	100			
1984	90				

Evaluation Month

Report-to-Report development factors
Evaluation Year basis

U/W Year	96/84	108/96	120/108	132/120
1980	1.00	1.00	1.50	1.00
1981	1.00	1.50	1.00	
1982	1.50	1.00		
1983	1.00			
Simple Avg:	1.13	1.17	1.25	1.00

Evaluation Month

Report-to-Report development factors
Calendar Year basis

U/W Year	87/86	88/87	89/88	90/89
1980	1.00	1.00	1.50	1.00
1981		1.00	1.50	1.00
1982			1.50	1.00
1983				1.00
Simple Avg:	1.00	1.00	1.50	1.00

Calendar Year

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