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INSURANCE REGULATORY AND DEVELOPMENT AUTHORITY

Foreword

22nd May,2008

One of the important tasks which the Authority has undertaken is the preparation of IBNR manual which would be of paramount use not only to the Appointed Actuaries but also to under-writers and other officials of non-life companies. The preparation of manual was entrusted to a committee which consists of:

1. Sri C.N. S. Shastri, Consultant

2. Mr. P.I, Majumdar, Actuary

3. Mr. N.K. Parikh, Actuary

4. Mr. Laxmanan , AA, HDFC Ergo General Insurance Co Ltd

5. Mr. K. Hanumatha Rao, AA, TATA AIG General Insurance Co Ltd

6. Ms. Asha Joshi, AA, Bajaj Allianz General Insruance Co Ltd

From IRDA, the following officials were associated with the preparation of the manual:

7. Mr. Randip Singh, Deputy Director

8. Ms. E. Sulochana, Assistant Director

9. Mr. MBVN. Murthy, Assistant Director

I am thankful to the Committee members for their contribution and also to my colleagues from IRADA. My sincere and special thanks goes to Sri C.N.S. Shastri, who had made a significant contribution in shaping up this report.

It is our intention to review this report at least once in a year so that suitable modifications could be carried out.

(R. Kannan)

MANUAL FOR ESTIMATION OF PROVISION FOR IBNR AND IBNER CLAIMS IN GENERAL INSURANCE BUSINESS

INTRODUCTION

This Manual is written as a guide for persons associated in the work of estimation of provisions for IBNR and IBNER claims in general insurance business in India. It assumes knowledge of general insurance business and the administration and accounting for such business. The contents of this Manual are not exhaustive and do not go into all the details of the subject under consideration. The person doing the estimation work (hereafter referred to as practitioner) is expected to apply the thoughts set out in the Manual to guide him in his work.

There is a substantial degree of subjectivity in the estimation of provision for IBNR and IBNER (hereafter referred to as IBNR) claims. This Manual will suggest the manner in which such subjective judgment should be exercised. The objective always should be to avoid under-estimation of the required provision while not consciously over-providing for IBNR claims. Use of subjective judgment should be supported by logical thinking based on credible facts and data that is capable of verification.

General insurance business is dynamic in nature and so, it is not possible to make statements about the nature of any particular class of business or claims development pattern in that class which will remain valid for all time. So, when reading this Manual, the practitioner should be aware of the present characteristics of the business and the comments in the Manual should be suitably adapted to any changes in characteristics that have taken place.

The methods outlined in this Manual are not exhaustive. After considerable experience of working with different methods, the authors of the Manual have made the recommendation to use the Link-ratio method or Chain-ladder method as the preferred method for estimation work. However, it is recognized that in specific circumstances another method may give better results. So, the practitioner should select the method best suited to the data on hand and where it is different from the Link-ratio method, he should provide cogent arguments in support of the method used and verify the estimate produced, by using another method.

Each time the practitioner does the work of estimation of provision for IBNR claims, he should review the work done in the previous years and examine the reasons for the variations between the estimated development of claims as per the earlier estimation work and the actual claims development over the period of review. Any lessons learnt from such review should be applied to the present work.

In order to ensure consistency in the process not only from one year to another but also among different practitioners, it is important for all practitioners to follow a **common discipline in the approach to the work and use commonly understood definitions for terms used**. This Manual aims to provide the framework of such discipline in the work. The Detailed Reporting Form and Data Forms prescribed by the IRDA are also aimed at achieving such consistency in work.

The work of estimation of the provision for IBNR claims is not complete without applying appropriate tests of credibility to the results. This Manual will provide guidance on the tests that should be applied. It is hoped to issue annually, data on the aggregate market experience in different classes of business on all indicators relevant to the estimation work. So, the practitioner is expected to review the results of his work not only by review of the actual developments over the recent past but also by comparison with the market level indicators and understanding the reasons for any observed variations.

Considering the very practical nature of the work covered by this Manual, it is planned to review the Manual at least once every year after the latest market level indicators are available, and the Manual will be updated suitably by a review group of practitioners, if found necessary.

MANUAL FOR ESTIMATION OF PROVISION FOR IBNR AND IBNER CLAIMS IN GENERAL INSURANCE BUSINESS

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IN GENERAL INSURANCE BUSINESS

1. NATURE OF GENERAL INSURANCE BUSINESS

1.1 General insurance business does not have an all-inclusive definition because it extends to provide insurance protection to every newly emerging risk to person or enterprise or property that is insurable. So, it is generally defined as all insurance business other than life or simply, non-life insurance.

1.2 There are a wide variety of types of insurances of person or property or liability that are broadly grouped into three major classes of insurance, namely, Fire, Marine and Miscellaneous. It is not proposed to go into the description of each of the several important types of insurance in this Manual. Suffice to say that most general insurance contracts are annual contracts. However, insurances of projects and of construction risk can be for longer durations of even a few years.

1.3 As at the date of the balance sheet, the liability in respect of insurance contracts already entered into and which are still in force or where claims have already arisen but have not been settled, are provided for under two heads namely:

1. Reserve for unexpired risks in respect of contracts that are in force and have an unexpired period on the balance sheet date, and any reserve for premium deficiency thereon; and
2. Provision for outstanding claims in respect of claims that have already arisen up to the balance sheet date and which are either fully or partially not settled by the balance sheet date.

1.4 Reserving for unexpired risks including provision for premium deficiency is not the subject matter of this manual.

1.5 Provision for outstanding claims relates to the following categories of claims:

1. Claims made under policies, whether liability is admitted or not, which remain partly or fully not settled by the balance sheet date;
2. Claims which have been declined but where the policyholder has the ability to pursue the claim through legal channels; and
3. Cases where an insured event has occurred, whether advised to the insurer or not, but where no formal claim has yet been lodged.

1.6 In respect of the first category listed above, the insurer will maintain a provision in its books of an amount which, in its best estimate, will be sufficient to settle the claim fully and pay the expenses directly related to the claim such as survey or investigation fees, legal fees etc. Since there is an estimation involved in this exercise, it can happen, depending on the nature of the claim, that the provision made proves inadequate. Such under-provision for outstanding claims is referred to as Incurred But Not Enough Reported (IBNER) claims. Since estimates can prove inadequate despite the best judgment, provision is made using mathematical techniques for IBNER claims.

1.7 Claims falling in the second category may either be kept alive in the books with a nominal provision of say, Re 1 or they may be removed from the list of outstanding claims and no provision made for them. When such a claim is taken to court, it is prudent to restore the provision for the claim till the case is decided. Where the claim is kept in the books, the restoration of provision will be seen in the category of IBNER claim. Where the claim is taken off the books, it will have to be revived and a fresh provision will have to be made for it. In that event, it will fall in the third category stated above, namely, IBNR claims.

1.8 There can be several reasons for not recognizing a claim after an insured event has occurred. These will be more specifically dealt with later. At this stage, it is enough to note that if an insured event has occurred that can give rise to a claim but is not recognized in the

books, then it falls in the category of Incurred But Not Reported (IBNR) Claims. Obviously, such claims cannot be provided for on a case-by-case basis and so, mathematical methods are used to estimate the provision necessary for IBNR claims.

1.9 The Balance Sheet will not present a true and fair view of the position of the liabilities of the insurer as on the date of the balance sheet without proper provision being made for IBNR and IBNER claims. This manual is concerned with proper estimation of such provision.

1.10 Each class of general insurance business has its own claims development characteristics that impact the provision for IBNR and IBNER claims. These will be dealt with in the next section of this Manual. Generally, the most important class of business requiring provision for IBNR and IBNER claims at present is Motor Third Party Liability insurance business.

2. <u>CLAIMS INCIDENCE AND SETTLEMENT PROCESS</u>

An insured event can arise at any time within the risk period under the contract of insurance. The following sequence of actions is involved in the processing of the resulting claim to settlement:

(i)	Insured event occurs;
(ii)	The insured or the third party claimant decides whether to make a claim under the insurance contract;
(iii)	A claim is notified to the insurer; such notification may be immediate or may be delayed; the notification may come from the insured or in case of a third party liability claim, it may come from the third party claimant or his lawyer or through process of court where the claimant files his claim;
(iv)	The insurer verifies the insurance particulars, registers the claim and makes an initial provision for it based on information available and past experience;
(v)	The insurer arranges for survey and assessment of the loss or investigation related to the claim;
(vi)	Based on the survey findings, the insurer reviews the provision for the claim and processes the claim for settlement. This may take the form of cash payment or authorization for repairs or replacement or authorization for medical treatment etc.;
(vii)	Where the liability for the loss is questioned, the insurer may decline the claim or offer a compromise settlement;
(viii)	The insured may accept the offer or negotiate further or take the matter to court;
(ix)	Provision for all outstanding claims are expected to be reviewed periodically by the insurer's staff;
(x)	Eventually, the liability and the amount payable are crystallized and the settlement takes place;
(xi)	In case of property claims, the insurer may take over the damaged property as salvage or may make an agreed deduction for the salvage value and leave the damaged property with the insured;
(xii)	In case of some claims there may be the possibility of making a recovery for the loss from other parties responsible for the loss; in such cases, the insurer may pursue such recovery under right of subrogation;
(xiii)	As soon as the survey report or investigation report is received, the insurer pays the related fees. Where the claim is pursued in court by the claimant, the insurer bears the legal fees of defending the action; likewise, where the insurer pursues recovery of claim through court or through recovery agents, it incurs costs on such action that are also paid as claims cost.

Delay in recognition of a claim by the insurer can arise at steps (ii) to (iv) listed above. It may also arise at step (vii) if the insurer removes the claim from its register of outstanding claims. Under-provision for claims can occur at steps (iv) and (ix).

2.3 FIRE INSURANCE BUSINESS

2.3.1 Generally, fire losses get reported to the insurance company with no delay. At most, by the next working day, the insurer is informed of the occurrence of a loss. The insurer will also appoint a surveyor to survey and assess the loss without any delay. So, reporting delays are almost non-existent. However, several cases of delayed recognition of Fire losses were observed in data furnished in Form A. The reason given was that these were losses on coinsurance policies where the lead insurer did not advise the claims promptly to the other coinsurers. This is not normal but an aberration in the Indian market, which the insurers should address. So, the practitioner should look into this aspect when reviewing claims data for Fire and other classes of insurance business.

2.3.2 In practice, most Fire material damage claims get settled within two to three months of occurrence and a majority of Business Interruption claims get settled within six months from date of occurrence of loss. So, as at any date, assuming an incurred claims ratio of say, 60%, the outstanding claims may be around 15% of the premium or 25% of the paid claims for the year. This is not a measure to base the calculation of IBNR but only a measure for cross-checking of results.

2.3.3 It is observed that in the vast majority of claims, the first estimate of loss tends to be higher than the final settled amount. So, one does not normally expect to see the IBNER factor in practice in fire insurance business.

2.4 MARINE CARGO INSURANCE

2.4.1 This class of business includes insurance of cargo transported by Sea or Air, or Land or a combination of these, transport by Post and storage incidental to transport. The actual transit period may be a few days to a few weeks. However the actual dates of start of transit and finish of transit are not known in advance in the vast majority of cases. Also, it is difficult to say that the probability of loss is constant on any date within the period of transit. More important, the occurrence of loss may remain unknown until the cargo is delivered and is opened for inspection and use. So, the reporting of loss can be delayed in a large proportion of cases.

2.4.2 It is normal practice for the consignee to arrange survey in the event of any apparent loss or damage to insured cargo such as visible damage to the package or container and then to present the claim with the survey reports in due course. Where the insurance is effected by the consignor, the consignee may advise the consignor about the claim and process the papers through the consignor. Due to these reasons, it is difficult to say whether a particular insured cargo has suffered any loss, for a few months after the insurance is effected. In other words, an element of IBNR is inherent in the nature of this business.

2.4.3 The time taken from the date of presentation of the claim for the loss with documents, to its settlement is quite short. Once a loss is reported and surveyed, the extent of loss can be estimated reasonably accurately. So, the element of IBNER is not significant for this class of business. In general average claims, the time taken to final settlement from date of occurrence of the general average event may even be a few years. But the average adjuster produces a first estimate of loss very quickly and the estimate tends to be higher than the final settlement amount. So, there is no significant IBNR or IBNER element in such claims.

2.4.4 Assuming the average spread of business by nature of transit and assuming an incurred claims ratio of say, 80%, the outstanding claims are likely to be around 40% of premium or

50% of paid claims for the preceding year. Again, this is not to be used as the method to estimate the provision for IBNR.

2.5 MARINE - OTHER THAN CARGO INSURANCE

2.5.1 Earlier, Marine had two sub-classes, namely Cargo and Hull. Hull dealt with insurance of vessels. However, slowly the frontier of marine business has expanded to cover not only cargo or hull but also "Energy risks" comprising of off-shore oil exploration and production facilities and support facilities, ship-building and ship-breaking risks, insurance of liabilities of Port or Terminal Operators, Multi-modal transport operators and so on to all types of insurances related to transport. Hence it is better described now as Marine – Other than Cargo.

2.5.2 The bulk of the premium in this sub-class comes from Marine Hull and Off-shore energy related risks. In these classes, losses get reported immediately upon occurrence. However, estimation of the loss at first intimation can be problematic. In case of ships, when the vessel scrapes bottom or when the accident does not affect the sea-worthiness of the vessel, the ship-owners do not immediately take the vessel to the shipyard for repairs. They make a quick first survey and continue to trade until the earliest convenient date for repairs or the next scheduled maintenance visit to the shipyard. In such cases, it has been found that the first estimates tend to be lower than the final repair cost. This leads to an IBNER factor that is inherent in the nature of the business. In respect of offshore energy risks, the first estimate tends to be higher than the final assessment of the loss. In respect of liability risks, quite often the first intimation of a claim may itself come much after the occurrence of the insured event and the claim may develop over a longer period if processed through the courts. In such cases, there will also be an IBNR factor related to the nature of the business.

2.5.3 The time taken from date of loss to its settlement for the run-of-the-mill losses tends to be much longer than for total losses or very large losses. Total loss claims may get paid within a couple of weeks after the facts are established while the smaller partial loss claims have to wait for completion of repairs to establish the amount of claim. This could even take a couple of years.

2.5.4 Assuming the average spread of business and assuming an incurred claims ratio of say, 80%, the outstanding claims are likely to be around 48% of premium or 60% of paid claims for the preceding year. Again, this is not to be used as the method to estimate the provision for IBNR.

2.6 ENGINEERING INSURANCE BUSINESS

2.6.1 This class of business can be broadly grouped into two major divisions, namely, annual contracts and project insurances where the project period can extend to more than a year. Project insurances are Contractor's All Risk or Erection All Risk and allied insurances such as Delayed Start Up or Advance Loss of Profits insurances. Annual insurances are covering material damage in respect of plant and equipment and Business Interruption or Loss of Profits Insurances related to material damage losses. These are insurances such as Machinery Breakdown, Boilers and Pressure Vessels Explosion, Contractor's Plant and Machinery insurances. It is customary when covering the equipments of Cold Storages also to give cover for deterioration of stocks following a machinery breakdown.

2.6.2 The claims development pattern in this class is similar to Fire insurance business. However, it is important to remember that project insurances carry extended periods of exposure to loss. So, when dealing with a portfolio having a predominance of project insurances, it is important to pay attention to the period of exposure to loss and the intensity of exposure to loss over the insurance period, to determine the earned premium appropriately.

2.7 MOTOR INSURANCE BUSINESS

2.7.1 Motor Insurance business is the most important class of business from the point of view of estimation of provision for IBNR. It also forms a big chunk of general insurance business and so, proper estimation of provision for IBNR in this class is very important. Motor insurance has two major sections, namely, "Own Damage" and "Third Party insurance". These two sections have very different claims development characteristics. So, all work in respect of motor insurance business should be done separately for the Own Damage section and separately for the Third Party section. The Own Damage section includes other risks that may be underwritten along with insurance of the vehicle, the most important of which, is the theft of the vehicle.

2.7.2 It has been observed in respect of large portfolios that the claims development pattern differs even by the types of vehicles or their usage such as two-wheelers, cars, taxis, private carriers, public carriers, private passenger vehicles, public passenger vehicles, other commercial vehicles and motor trade risks. So, in respect of large portfolios it is useful to look at data separately for each of these types of vehicles. However, if the break up of the portfolio renders the data too scanty, it would affect the credibility of the estimation process and is therefore, not desirable.

2.7.3 Reporting of losses on the Own Damage section is quite fast and the entire process of repairs and settlement of claim is completed within a matter of weeks. Even theft claims tend to get settled quite fast. If we assume a ratio of incurred claims to earned premium for the Own Damage section of say, 60%, the outstanding claims may be around 25% of the paid claims or 15% of the earned premiums for the preceding year.

2.7.4 Motor Third Party Claims are subject to quite significant reporting delays. This is because notwithstanding the provisions of the insurance policy, the vehicle owners may not report loss-causing-events and the first intimation of loss may come from the injured third party. This may be either a letter from the lawyer representing the injured third party or a summons from the Motor Accident Claims Tribunal. Such delays can extend into years even. So, the IBNR factor is quite prominent for this class of business. There may be some variations in reporting delays also by types of vehicles.

2.7.5 Due to the large proportion of Third Party claims being settled through courts, the average period from accident to settlement may be around 2 years or more. So, assuming an incurred claims ratio of 150% for third party claims, the outstanding claims may be around 75% of earned premiums or 50% of paid claims over the preceding year. However, the claims settlement pattern for this sub-class of business varies substantially depending on the insurer's claims settlement practice and so, the length of tail will vary also from company to company.

2.8 AVIATION INSURANCE

2.8.1 This class of business is not very significant for most insurers on a "net of reinsurance" basis because the levels of retention are generally very low. In this class of business also, there are two distinct sub-classes, namely, Aviation Hull and allied insurances and Aviation Liability. These have distinct claims settlement patterns. Generally, the frequency of claims tends to be low although Hull claims may be generally large. Aviation related liabilities such as Airport Operator's Liability are also included in this class of business. Another important type of insurance in terms of sums insured although not in volume, included in this class relates to space related insurances.

2.8.2 Due to the limited spread of risks, the claims ratio fluctuates quite widely from one year to another. Due to the small number of policies and claims, credibility of the data for mathematical estimation may be a problem. So, the data for this class may be combined with

data for Marine – Other than cargo or if even that class has limited data, then it can be combined with Miscellaneous – Others.

2.9 WORKMEN'S COMPENSATION INSURANCE

2.9.1 This class of business is relatively a minor class of business characterized by quite modest liability limits. Generally, these claims get reported and settled quite quickly. Until recently, this was a tariff class of business and so, had very low claims ratios. The level at which the claims ratio will stabilize after removal of tariffs remains to be seen. The IBNR factor in this class of business is not very significant.

2.10 PERSONAL ACCIDENT INSURANCE

2.10.1 This is a class of business where the claims are reported quite quickly and the settlement also is fast. Since most of the claims payments in this class are in the nature of benefit payments, there is not much uncertainty about the quantum of claim. So, IBNR and IBNER factors are not very significant.

2.10.2 Assuming the average settlement time to be around 1 month and assuming an incurred claims ratio of say 70%, the outstanding claims are likely to be around 6% of the earned premium or 8% of the paid claims for the preceding year.

2.11 HEALTH INSURANCE BUSINESS

2.11.1 This is a rapidly growing class of business and has already reached a significant share of the total general insurance premium. Sums insured limits are quite modest but the frequency of claims may be higher at around 8% of the number of lives exposed. A major portion of the premium in this class of business comes through group insurance schemes. Also, a large proportion of claims are serviced by TPAs as cash-less payments. So, the reporting time as well as settlement time is quite low. Due to the competition for tariff classes of business from the same clients, this class was used as a loss-leader to win the other accounts. However, it is hoped that with the freeing of tariffs, this class will be rated on merits. So, the claims ratios of the past are not a good guide to what can be expected in future. One should estimate the increase in premium levels and adjust for it in estimating the likely incurred claims ratio for credibility test.

2.11.2 Assuming an incurred claims ratio of 80% and assuming a time to settlement of one month, the outstanding claims are likely to be around 6% of earned premiums or 7% of paid claims for the preceding year.

2.12 LIABILITY CLASSES OF BUSINESS

2.12.1 In many developed markets Liability insurances are a significant class of business. They cover general liability insurances, products liability insurances and professional indemnity insurances. There can be significant reporting delays especially in respect of products liability insurances and since many of the claims may be processed through courts, there is also settlement delay. However, in India, these characteristics of the business are not yet prominent.

2.12.2 Due to the small volume of this class of business at present, there is no market pattern of claims development or a market claims ratio for this class of business.

2.13 OTHER MISCELLANEOUS INSURANCES

2.13.1 This class covers different types of insurances such as Burglary, Fidelity Guarantee, Banker's Indemnity, Jeweler's Block, Equipments All Risks and "Special contingency" insurances that cover various miscellaneous types of insurances. Some insurers also

underwrite commercial credit insurances and agricultural insurances and show them in this class.

2.13.2 These classes of insurances are also generally quick reporting and quick settlement of claims classes, although there may be some reporting delays in respect of claims relating to dishonesty due to the time taken for discovery.

3. <u>IMPACT OF VARIOUS FACTORS ON CLAIMS EXPERIENCE</u>

3.1 Even within the same class of business, two insurers can produce distinctly different claims experience and even the same insurer may produce different claims experience from one year to another. So, the practitioner is expected to study all aspects of the portfolio of the insurer and the management philosophy and practices in the matter of underwriting and claims before embarking on the estimation exercise.

3.2 <u>Composition of portfolio</u> – The nature of risks underwritten by the insurer and forming part of its portfolio has an influence on the expected claims experience. For example, in Fire insurance business, the claims ratios of the small sums insured simple and commercial risks is significantly different from the claims experience of the larger sums insured industrial risks. It is not just the claims ratio that is different but also the claims profile, namely, the frequency and amount-wise distribution of claims, that is different. With the removal of tariffs, even the rating adequacy for different sections of business will depend on the extent of competition in the marketplace.

3.3 <u>Balance and spread of portfolio</u> – The "Balance" of the portfolio is generally judged by the number of risks composed in the portfolio or in other words, the ratio of the maximum exposure to loss per risk to the premium volume of the portfolio. The "spread" of the portfolio is judged by the dispersion of the portfolio by geographic spread or by the types of risks or industries and trades covered. A portfolio with good balance and spread will record greater stability in claims ratios than a portfolio that lacks balance or spread.

3.4 <u>Exposure to catastrophe perils</u> – In some classes of business such as Fire, Engineering or Motor one can insure catastrophe perils also. In such cases, the claims ratio is susceptible to sharp fluctuations in the event of occurrence of a catastrophe event. Where the portfolio of business is spread over several catastrophe zones, the fluctuation in claims ratio will be less severe than where the portfolio is derived from a single catastrophe zone.

3.5 <u>Selection of risks</u> – The underwriting philosophy of the insurer will determine its approach to acceptance of risks. An insurer that is very selective in acceptance of risks may produce a better claims experience compared to an insurer that does not exercise any selection of risks and leaves it to the law of averages to take care of the overall experience.

3.6 <u>Growth rates</u> – When an insurer grows at around the overall growth rate of the market in that class of business, it is possible that the insurer has maintained its underwriting policy undisturbed. When an insurer is growing significantly faster than the market growth rate, the practitioner should examine how such faster growth is achieved. For example, if the faster growth is achieved by relaxing the underwriting controls, it is possible that the portfolio will produce higher claims ratios. If the faster growth rate is achieved by reducing the level of premium rates, this also will push up the expected claims ratios. On the other hand, if the faster growth rate is achieved by a new business tie up or through the introduction of new attractive products, then the impact on the expected claims ratio will reflect the expected claims ratios of this new source of business. Similarly, when an insurer's growth rate is materially lower than the market growth rate, it is necessary to understand what is happening. It is possible that the insurer has introduced stricter underwriting controls leading to shedding of unprofitable accounts. If this be the position, the expected claims ratio will improve. If the reduced growth rate is due to the insurer losing its

competitive edge, the chances are that it will lose the better quality accounts faster than the other accounts and the expected claims ratio will rise.

3.7 <u>Rates and deductibles</u> – All tariffs of premium rates have been removed now. So, there is no single level of rates for all insurers. Where an insurer quotes lower levels of rates compared to others for risks of similar hazard, it is likely to produce a higher claims ratio. Even for the same company, if it generally lowers its schedule of rates, it will produce a higher claims ratio than before.

3.7 <u>Dispersion of Underwriting Authority</u> – Different managements have different operating styles. Some managements take control on underwriting at a higher level of technical expertise and all business offices are required to refer to the designated underwriters for acceptance and rating of risks. Other insurers may provide an underwriting manual and enable all offices of the insurer to underwrite and accept business. Generally speaking, the better the quality of underwriting, the better will be the claims ratio. So, where the underwriting is widely dispersed, that portfolio is likely to produce higher claims ratios than the portfolio that has been technically underwritten. One other factor affecting the claims ratio is the combining of business development and underwriting functions with the same persons. It creates an unseen pressure on the person to relax underwriting controls in the anxiety to achieve premium growth targets. This is also the position where the underwriters are under pressure to be "cooperative" in development of business.

3.8 <u>Homogeneity of risk exposures</u> – For a portfolio where the exposure to loss for the several risks comprising the portfolio are homogeneous, the expected claims ratio will be more stable. But where the individual risk exposures to loss vary widely including several individually large values, there is a possibility of the claims ratio being affected by individual large claims. The effect of variation in exposures on gross basis is moderated due to the insurer's retention and reinsurance policy. So, we should look at homogeneity of exposures on a "net of reinsurance" basis.

3.9 <u>External factors</u> – Factors totally extraneous to insurance can affect the claims experience of the business. For example, the operation of natural perils can result in a sudden rise in the frequency and quantum of losses in a year. Climatic factors such as a very dry summer can increase the frequency of fire claims. Adverse economic conditions such as slump in demand or increase in cost of funds or change in fashions can render a normally profitable enterprise into a loss. This can increase the risk of moral hazard in claims. Since fraud in claims is difficult to prove, the overall claims cost will go up. A change in law, such as the law of liability can also impact the future claims cost.

3.10 <u>Management policy</u> – The Underwriting Policy laid down by the Board of Directors will provide guidance to the management on all of the above matters. When this policy is varied, one can expect to see it reflected soon thereafter in the movement of the claims ratio. Even where the underwriting policy has not been altered, the portfolio will change depending on the attitude to underwriting of the persons in charge. The more aggressive underwriter will take a more optimistic view of things and is likely to produce a higher claims ratio compared to a conservative underwriter. On the other hand, an underwriter who is over-conservative is likely to write much less business and in that way affect the balance and spread of the portfolio.

4. <u>TAIL FACTOR IN CLAIMS PROCESSING TO SETTLEMENT</u>

4.1 The "Tail" of claims referred to here is the length of time that is normal between the occurrence of an event giving rise to a claim and the final settlement of that claim. In most classes of Property insurances, the tail is short. In several classes of Liability insurance, the tail is longer. Some comments on this matter have already been made in Para 2 above. The length of tail is the period over which the final claims picture emerges. Even if all claims do

not get paid, if the paid plus outstanding claims ratio does not rise any longer, then one can consider that year as fully developed.

4.2 In respect of short-tail business, the claims position develops fully by 36 months. In Indian circumstances, even Motor Third Party claims develop fairly fully by 60 months. So, data in respect of claims development over 60 months (i.e. current and preceding four years) is adequate in most cases. The tail is not only related to the class of business but also the claims settlement practices of the insurer. This will be dealt with in the next paragraph.

4.3 The assumption in most estimation methods is that the claims development pattern remains stable. This assumption cannot be accepted without first examining all the factors affecting the expected claims ratio of the portfolio and the speed of development of claims. The factors affecting the claims ratio and the speed of development of claims are referred to in paragraphs 2, 3 and 5.

4.4 Graph 1 illustrates the development of paid claims in respect of a portfolio with short-tail, medium-tail and long-tail business. The claims settlement policy of a company or even the approach of a claims officer of the company to processing of claims can impact the length of tail of the portfolio. Table 1 and Graph 2 below illustrate the impact of a slower speed of settlement of claims assuming that they have no impact on the final paid claims cost. Generally, delayed settlement of claims tends to raise the cost of settlement of claims, although in the short-run, the claims paid ratios appear to be lower. Slower settlement of claims may occur when the claims manager changes or the company changes its approach to settlement of claims to get over cash flow problems.

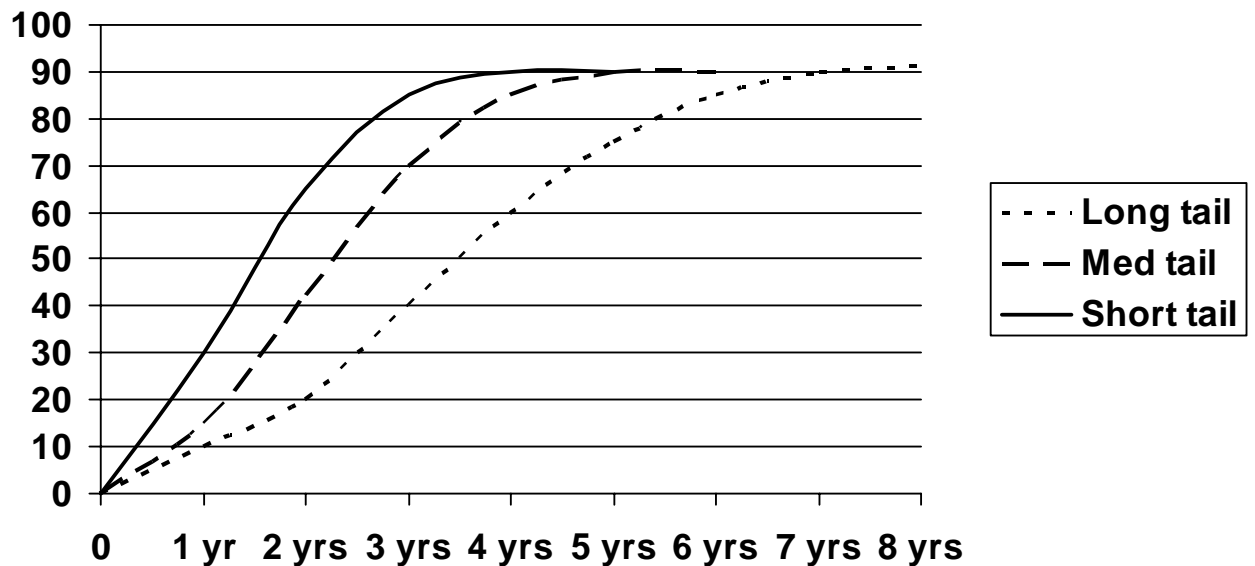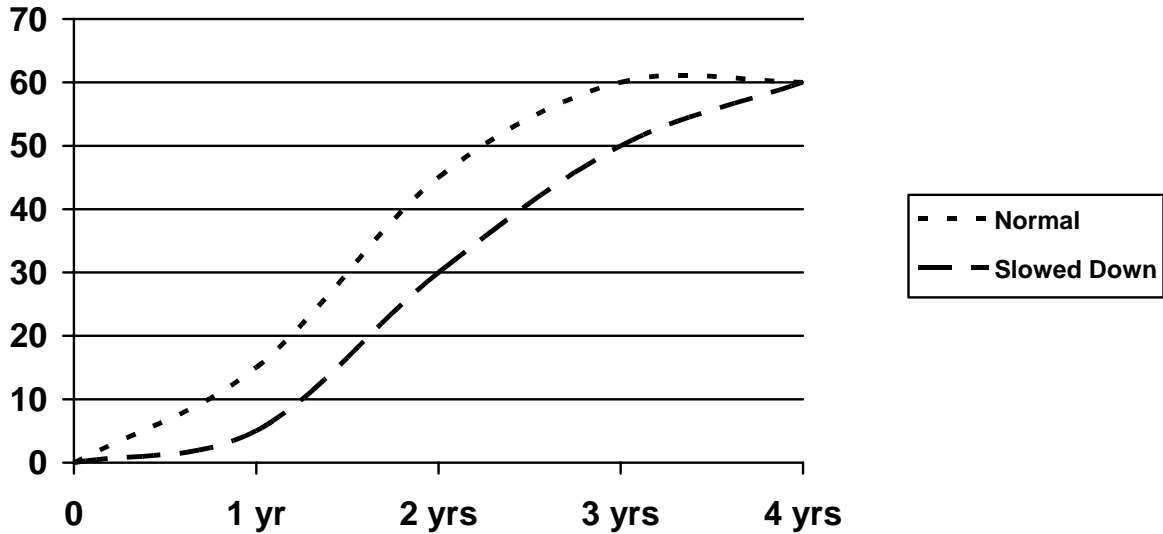## Graph 1 - "TAIL" OF CLAIMS DEVELOPMENT PAID CLAIMS RATIO

Table 1
Impact of slowing down in speed of settlement of claims

Speed of Settlement	Cumulative paid claims ratio at end of stated months			
	12 months	24 months	36 months	48 months
Normal	15%	45%	60%	60%
Slowed down	5%	30%	50%	60%

Graph 2 - IMPACT OF SLOWING DOWN IN SPEED OF SETTLEMENT OF CLAIMS

5. IMPACT OF MANAGEMENT PRACTICES ON CLAIMS DEVELOPMENT

5.1 The general expectation is that the management of an insurance company will deal with claims in an expeditious manner. The characteristics of the business will determine the claims development pattern in such circumstances. However, in actual practice not all managements work in the same way in relation to recognition and processing of claims to settlement. So, the claims development pattern and even the length of the "tail" may be influenced by management practices. One could term the management approach to recognition and processing of a claim as either pro-active or passive or even positively dilatory.

5.2 There are two factors in recognition of a claim, namely, accepting that there is a claim under the policy and providing an adequate amount for that claim. By way of an illustration, if an accident to a vehicle is reported, the management of an insurer is expected to enquire into the claims arising out of that accident and provide for them. In practice, the vehicle owner may not even bother to report an accident if he has no claim to make in respect of damage to the vehicle. In such a case, there is no way that any management can recognize a Third Party claim that may have arisen from that accident. However, if there is damage to the vehicle itself, the vehicle owner will report the damage but may remain silent on any injuries to Third Parties. In such an event, one insurer may just recognize the "Own Damage" claim and not enquire about any Third Party claim, while another insurer may ask its surveyor to enquire and report on any injuries to Third Parties arising from the accident. Once the insurer becomes aware that a Third Party injury has occurred, the latter insurer may recognize it as a Third Party Claim and make an ad hoc provision for it. The former insurer will not recognize the claim until it receives an intimation of the claim either from the Third Party or its lawyer or through summons from the Motor Accident Claims Tribunal where the Third Party may have lodged his claim. Since there is no limitation period for filing claim in the MACT, the difference in the dates of recognition of the claim by the two insurers can be even a couple of years. Similarly, where an insurer becomes aware of a claim but does not have enough information to quantify the claim, it may either make an ad hoc nominal provision for the claim and wait for the claim to crystallize or the insurer may make an ad hoc provision equal to the average amount paid in the recent past for a claim of that

type and pro-actively seek information to enable better estimation of the claim and revise the provision suitably as soon as possible.

5.3 There can also be material differences in approach in processing a claim to settlement. One insurer may pro-actively seek to negotiate the settlement of the claim and make payment as soon as agreement is reached while another insurer may sit back and allow the claim to develop to the stage of quantification and demand for payment. Even the general approach to claims settlements may be different. One insurer may apply very severe tests of admissibility and quantum and offer the least possible amount by way of settlement. Such an insurer may be prepared to allow the claim to go into dispute rather than secure a compromise settlement. Another insurer may take a broader view of liability and quantum and try its best to reach a mutually acceptable settlement rather than let the claim go into dispute.

5.4 There are also differences in keeping a registered claim open in the books of the insurer. One insurer may remove a claim where liability has been declined, from its book of outstanding claims while another insurer may keep the registration alive until the claim is definitely withdrawn or the limitation period for its revival expires. Some insurers may keep the claim alive with a nominal provision of Re.1 while some others may maintain the provision originally made or a reduced provision sufficient to cover defence costs.

5.5 All these differences in styles will have direct impact on the speed of emergence of claims and on the IBNER factor. A pro-active insurer may record a shorter tail of claims while a passive insurer may experience a longer tail of claims. Since the insurer's claims settlement practices are implemented through the managers in charge, even the same insurer may exhibit a changing claims development pattern merely with change of the claims managers.

5.6 This points to the risk that the management of an insurer may consciously alter the claims development pattern by changing the claims recognition and processing practices. Such a change may be made when the insurer is under pressure to show profits in its accounts when the quality of business is not good or to overcome solvency margin deficiencies. Sometimes managements of insurers may prolong the settlement process when faced with cash flow problems, resulting in slower development of paid claims.

6. CONCEPT OF IBNR AND IBNER AND FACTORS INFLUENCING THEM

6.1 The concepts of provision for IBNR and IBNER claims were introduced in paragraphs 1.6 to 1.10 above. An element of IBNR is inherent in the nature of the business. However, this is not necessarily so for IBNER. If an insurer adopts a conservative reserving practice, it may not have an IBNER element in its provisions.

6.2 Although an IBNR element may be inherent in certain classes of business, the quantum of IBNR can vary depending on the company's underwriting and claims reserving and processing practices. Therefore, one should be careful when trying to draw conclusions about the adequacy of the provision for IBNR in relation to premium or known outstanding claims. An insurer with deficient reserving practices will record a higher IBNR provision and if we judge the adequacy of the provision for IBNR by reference to premium or known outstanding claims, it will appear to be better reserved than an insurer that is conservative and pro-active in recognizing and reserving for claims and hence requires a smaller provision for IBNR. This can be very misleading.

6.3 The safest way to review the provision for IBNR claims is by looking at the calculated ultimate claims ratios and taking a view on their adequacy in the background of the knowledge of the insurer's portfolio composition, management practices in underwriting and claims and the general trend in business and the overall market experience for that class of business.

6.4 Conceptually, the total claims cost is composed of two variables, namely, the frequency of claims and the quantum of claims. The methods of estimation of IBNR and IBNER claims provisions may work on these two factors separately or may work on the combination of the two, namely the total claims cost. IBNER relates to claims that are already recognized in the books of the insurer whereas IBNR relates to claims not yet recognized by the insurer. Practitioners will find by experience that there is no great virtue in trying to establish these two types of provisions independently because in the ultimate analysis, we are only concerned with the overall claims amount that needs to be provided in addition to the recorded provisions. Besides, many of the commonly used methods of estimation work on the combined effect of both IBNR and IBNER. It is also not necessary to maintain separate provisions for the two for any purpose. Hence the IRDA does not require the provision for IBNR and IBNER to be estimated separately.

6.5 Some practitioners wish to recognize the time factor in the estimated provision for IBNR and IBNER (hereafter called simply as IBNR) claims because these are claims amounts that will be paid in the future. There are two factors related to time to be taken into account. First, the funds set apart now will earn interest till the amounts are paid and the practitioners feel that this should be recognized and allowed for in the provision. This will involve discounting the provision for the interest earning capability over the future. Secondly, claims cost may progressively go up in future to reflect increases in cost of living or inflation in values. Sometimes the claim amount is increased to provide for interest on the amount awarded from the date of the event till the date of payment. This is particularly important for liability claims. So, the provision for future claims cost should have a margin added into the provision to cover the inflation factor until the date of settlement. One factor counter-balances the other. Besides, in all the provisions in general insurance no note is taken of the likely inflation in cost or likely investment earning on the funds reserved for claims. Hence it appears pointless to complicate the estimation process by bringing these sophistications into calculations. Logically, so long as the interest rates remain higher than the inflation rates, there will always be a safety margin in the provisions for IBNR claims if the interest factor and inflation factor are ignored. Hence the Authority has advised the practitioners to ignore both the inflation factor as well as the time value of funds.

6.6 <u>Provision on "Net of reinsurance" basis</u> – An insurer's accounts are prepared on a "net of reinsurance" basis. So, the provision for IBNR claims should also be made on a net of reinsurance basis. Here, some practitioners prefer to operate on the gross amounts before reinsurance and after establishing the provision for IBNR claims on a gross basis they arrive at the estimate on net of reinsurance basis by making an adjustment for reinsurance. It has been found that the method used for allowing for reinsurance by some practitioners is technically flawed and it renders the exercise unreliable.

6.7 Unless the entire reinsurance is on a quota share basis, it is improper to apply a ratio of reinsurance ceded premium to gross premium or ratio of reinsurance ceded claims to gross claims to derive the net of reinsurance provision for IBNR from the gross provision. Except for Motor insurance, reinsurance is generally not on quota share basis and this method of calculating net of reinsurance provision is technically unsound. When reinsurance is on surplus basis, it impacts the claims on larger sum insured risks differently from claims on the lower sums insured risks. When reinsurance is on Per Risk Excess of Loss basis, it impacts individually large claims differently from smaller size claims. Reinsurance on per event Catastrophe Excess of Loss basis comes in only when the aggregate of losses by one event net of other reinsurances exceeds the catastrophe loss retention. Each type of reinsurance impacts the claims profile differently and so, applying any overall ratios is bound to bring in errors. Where the insurer's system is unable to provide the net of reinsurance figures without a time parallax, the practitioner may use a suitable approximation method but he must insist on the software being modified to provide the reinsurance and net of reinsurance figures simultaneously with the gross figures at least hereafter.

6.8 If the practitioner is still keen to work on gross basis, he should similarly work on the figures for reinsurance cessions and derive the net IBNR provision by deducting the provision on reinsurance cessions from the provision on gross basis. This is very convoluted and does not lead to any greater accuracy in estimation than working straight-away on figures net of reinsurance. One other strong reason for working on "Net of reinsurance" basis is that the distribution of claims by amount will show much less variation on net of reinsurance basis than on gross basis because the disturbance caused by individually large claims will get moderated by the effect of reinsurance protection. So, the data becomes more homogeneous on net of reinsurance basis and renders the estimation process more dependable. Hence IRDA has asked that practitioners work on net of reinsurance figures.

7. COMPILATION OF DATA TO ENABLE ESTIMATION OF PROVISION FOR IBNR CLAIMS

7.1 Class-wise data – Data should be compiled separately for each of the accounting segments of business specified in the Accounts Regulations. In addition, the Motor insurance data should be compiled separately for Third Party insurance risk and for "Other" risks, generally termed as "Own Damage". Where the data is adequate, it may be useful to compile data separately for two-wheelers, cars and commercial vehicles because these do show some differences in claims development. However, it is pointless breaking up the data to an extent where the figures become too small to serve as a reliable basis for estimation work. In fact, for some insurers, although data may be separately compiled for each of the accounts segments, data for some sub-classes may be too small to enable independent estimation work. In such cases, it makes sense to merge data for the small sub-classes with data for larger classes of business having similar claims development profile.

7.2 Source of data: Data should be complete and should tally with the audited accounts. This can be ensured only by deriving the data from the primary underwriting and claims source and applying cross-checks at every stage to ensure that the data correspond to the audited accounts. A very common deficiency that has been found in the data is that the insurers do not pass the reinsurance entries simultaneously with the entries for the gross figures. This time parallax results in absurd figures being thrown up on a net of reinsurance basis. In such a case, the data will have to be "cleaned" by re-assigning the reinsurance entries to the appropriate gross entries. However, to prevent such deficiency in accounting practice to continue, the practitioner should ensure that the insurer corrects its accounting practice and modifies the software to recognize reinsurance cession entries simultaneously with gross entries.

7.3 Organization of data: Data can be organized in either of two ways, namely, on underwriting year basis or on year of occurrence of loss basis. A feature of data organized on underwriting year basis is that even in respect of annual policies, the period of exposure to loss extends over a time period of 24 months and so, the claims development over the first 24 months of every underwriting year requires special consideration. As at the balance sheet date, the latest underwriting year is still incomplete and risks continue to be in force. So, when calculating the IBNR provision for the latest underwriting year deriving from the ultimate claims ratio, one must take note of the reserve for unexpired risks and allow for it in the calculated figure of the undeveloped claims for that year. This is needlessly confusing. It is much neater to work on Earned premiums and year of occurrence of loss basis. The only sub-class of business where the underwriting year basis may be better is the insurance of projects that extends over more than one year. However, this is not yet that important in the Indian context. Hence the IRDA has chosen to require data to be organized on year of occurrence of loss basis. As already stated, data is required to be compiled on a net of reinsurance basis.

7.4 Impact of individually large claims and claims in respect of catastrophe occurrences: The progression of claims is disturbed by the inclusion of figures in respect of individually large claims or claims relating to catastrophe occurrences. Hence the best results are obtained by

working on claims excluding such individually large claims and claims in respect of catastrophe occurrences and looking at the unusual claims separately for any IBNR factor to be provided for in respect of those claims.

7.5 <u>Working on Paid Claims in preference to incurred claims</u>: Some practitioners consider it better to work on incurred claims than working on paid claims. This method includes the subjective element of estimates provided for outstanding claims in the figures used for estimation of IBNR and to that extent the data on which the estimation process is based, becomes subject to errors caused by changes in reserving practice. The impact of claims reserving practice is illustrated in Graph 3 below. So, the IRDA has asked that work should be done only on the development of paid claims, which are definite figures. If the practitioner considers it appropriate, he may cross-check his work using incurred claims. Some practitioners suggest working on the IBNR estimates themselves extrapolating from the estimates of past years to derive the estimates for the current year. This method suffers from the same deficiency as working on incurred claims. Estimates of IBNR are in effect, residual figures representing the amount derived from the estimated ultimate claims cost after allowing for claims paid and provided for. So, using IBNR figures as a basis for direct estimation makes many more assumptions with regard to claims practice, which may not be true, and renders the exercise less reliable. So, this method is not recommended. There is greater predictability in the development of paid claims as illustrated in Graph 4 below.

Graph 3 - CLAIMS DEVELOPMENT PATTERN
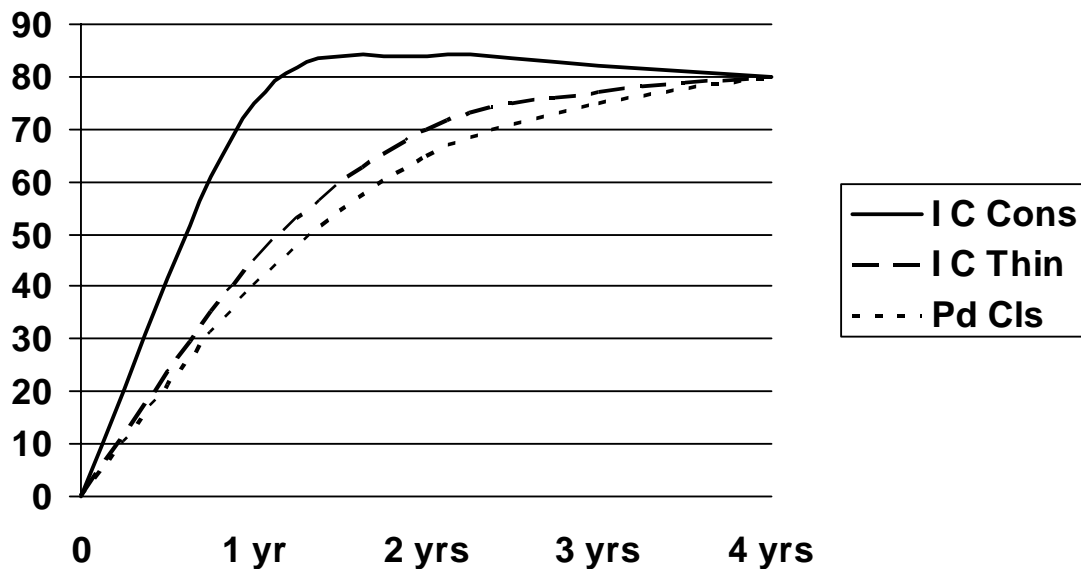
IC Cons = Incurred Claims reserved conservatively
IC Thin = Incurred Claims reserved inadequately
Pd Cls = Paid Claims

Graph 4 - **PAID CLAIMS DEVELOPMENT**
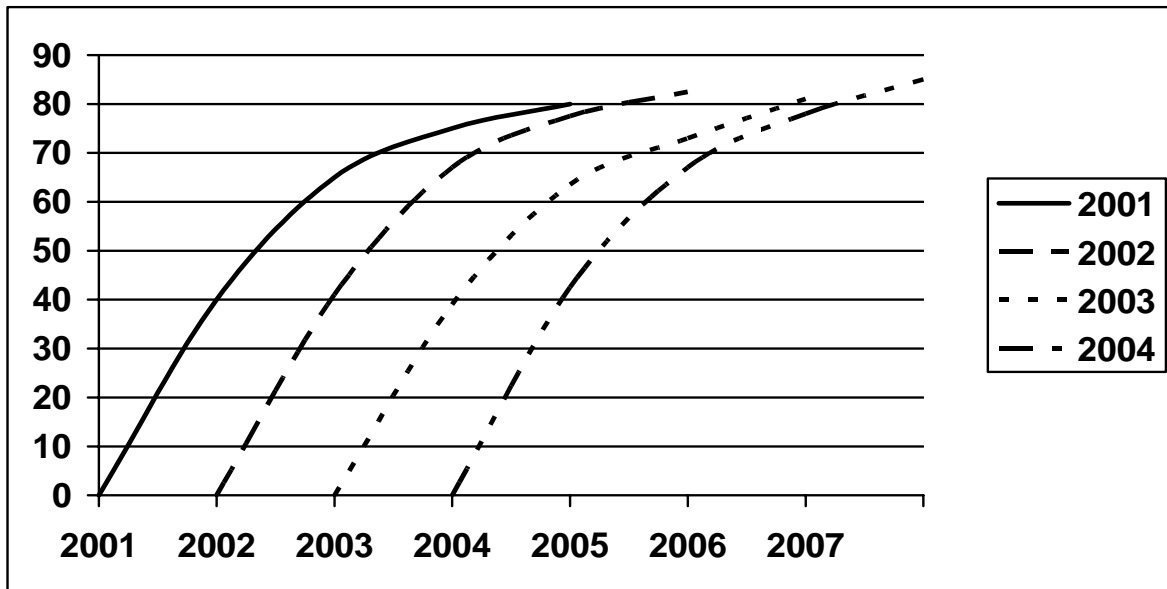
7.6 <u>Forms prescribed for data compilation</u>: The guidelines issued by the IRDA for estimation of IBNR have prescribed three forms in which data should be compiled. These forms have been prescribed to ensure consistency in data among all insurers thus enabling aggregation of data across all insurers. Also, based on working experience with the estimation of IBNR, these represent the best method of presentation of data for the estimation process. The Forms prescribed are as follows:

<u>Form A</u> – This Form presents data on premiums written and on movement in claims starting with the provisions at the beginning of the year and recording movements during the year, new registrations or re-registrations of claims closed earlier, and the provisions at the end of the year. This form does not attempt to capture periodic revisions in estimates because they are not material to the estimation exercise. So, please do not expect the figures to tally across this form. Of course, the practitioner should ensure that the data tallies with audited figures. **Annexure I** contains the prescribed Form and the instructions for its completion. It also gives the several validation tests that should be applied to the data in this Form. It also draws attention to the possibility of change in portfolio composition or underwriting policy as reflected in the average premium per policy that can be worked out based on data in this form. For this purpose, the number of policies requires to be modified to represent the number of units of exposure such as number of shipments covered in Cargo business, or number of persons insured in Health insurance or PA insurance business.

<u>Form B1</u> – This Form tracks the development of paid claims amounts in respect of each year of occurrence over several accounting periods. Some practitioners consider it better to work on claims ratios rather than on claims amounts. When working on claims ratios, the movements in the size of the portfolio and any possible movements in claims development get lost sight of. **Annexure II** contains the prescribed form.

<u>Form B2</u> – This form is similar to Form B1 but tracks the number of policies exposed to loss and the number of claims paid. It can be used to estimate the ultimate expected frequency of claims, which is a very important test of credibility on the data and the estimation process. **Annexure III** contains the prescribed form.

8. <u>WORKING WITH INCOMPLETE DATA</u>

8.1 <u>Data for earlier years not being available</u> – The IT systems in some insurers did not visualize the need for furnishing data in the prescribed forms and so the required capability has not been built into the software. Insurers may also find it difficult to re-construct the data for past years in the manner required. In such cases, the normal estimation methods may not be workable for want of data. A modification of the method to suit such cases may be made as appropriate to the circumstances of each case.

8.2 <u>All required particulars not being available</u> – The work around can be planned only after ascertaining the missing information. Data on paid claims is essential without which no estimation exercise is possible. However, if some non-essential information such as the number of cases closed without payment is not available, one can live with that.

8.3 <u>DATA COVERING 100% OF THE BUSINESS NOT BEING AVAILABLE</u> – Some insurers are in the process of upgrading their software to provide the data required. In such cases it can happen that the required data is not available in respect of all the business of the insurer but it is available for some of the offices of the insurer. In such cases, if the section of business for which data is available is fairly representative of the total portfolio, then one can do the estimation exercise based on the sample for which required information is available and project to 100% provision based on the sample estimate. Some insurers may pay claims in respect of policies issued at other branches at the branch where the claim is made. In such cases, unless the accounting system re-assigns the paid amount to the branch where the premium was accounted, there will be an important lack of correspondence between the premiums and claims in the selected sample, which can destroy the fidelity of the estimation process. For this purpose, the sample data should contain both the premium information and the entire claims in respect of such business. Since the estimation process requires study of claims development over several years, it is important to ensure that the composition of the sample selected for the estimation exercise does not change from year to year over the period. It is not appropriate to use different samples for different years even if each year's data is extrapolated to 100% by applying the "Rule of three".

8.4 <u>A NEW PORTFOLIO</u> – When dealing with a new insurer, there is no possibility of working on its own data. In such cases, the estimation can only be done by comparison with other insurers having similar portfolio for whom the estimation exercise is possible. In order to facilitate such an exercise, the IRDA plans to publish aggregated data of all insurers that can be used as a cross-check on work done or as a point of reference for a new insurer.

9. <u>METHODS OF ESTIMATION OF PROVISION FOR IBNR</u>

9.1 Several methods of estimation of the provision for IBNR are available. The practitioner may have his preference for a particular method based on his experience with such work in the past. All methods use the data of the past to project the future and derive the estimated provision required from such projection. Such projection can only be valid provided the assumptions underlying such projection are valid. It is good self-discipline to set down the assumptions underlying the estimation method used. The first step in the estimation exercise is the validation of each of the underlying assumptions. As a part of the process, the practitioner must examine whether there are any developments of the nature dealt with in paragraphs 3 to 6 above that can impact the future claims development of the incomplete years. The estimation exercise is not complete without applying tests of credibility to the results produced. The practitioner should also check the claims development since the last estimation exercise to see how far the estimation process is validated by the emerging results.

9.2 As stated earlier, it is not advisable to work on incurred claims or directly on IBNR estimates of past years because they include a substantial subjective element in the estimation of outstanding claims. Even where a practitioner uses incurred claims development as a cross-check on another method, he should first ensure by enquiry that there has been no change in the procedures for recognition and provision for claims.

9.3 It is important for the practitioner to remember that the mathematics is only the tool in the exercise of estimation and it cannot be given the status of infallibility. The results for the recent years that are in the early stage of development are quite likely to be incorrect and will require moderation or even to be over-ridden by other methods to arrive at credible provisions. Very often, the mathematics will produce a progressively reducing ultimate claims ratio, which may not be true. So, when the practitioner sees such a progression in ultimate claims ratio, he should review the work and moderate the results suitably. A very useful check in this connection is to study the consistency in paid claims ratios at similar durations of development of claims, for the different years of occurrence. The reasons for any observed changes in ratios at like durations should be examined in order to evaluate the changes necessary to the computed ultimate claims ratios.

9.4 The estimation process is in itself an exercise to arrive at an approximate estimate. So, it is not necessary to work to the nearest rupee or use several places of decimals in the ratios. For example, it is enough to work on amounts in thousands and ratios up to three places of decimal. Some practitioners work on quarterly figures and track development on quarterly basis. Since the vast majority of insurance policies are annual policies, it is quite adequate to work on yearly figures. If the practitioner chooses to work on quarterly figures, he should also break the claims data for tracking on quarterly basis for date of occurrence and quarterly earned premiums.

9.5 In any estimation exercise, the practitioner should have an a priori view on the estimated amount or ratio he expects to see. If the mathematics throws up a materially different figure, he should not accept it without detailed enquiry and convincing justification. For example, if the mathematics produces an incurred claims ratio in Motor insurance of 35% when every insurer in the market is struggling to achieve a lower figure than 70%, the practitioner should reject the result and review the work and the methods used.

9.6 Sometimes the mathematics will throw up negative values for the provision for IBNR claims. It is incorrect to assume that the estimation process cannot be wrong and take credit for the negative value of IBNR. Perhaps, the underlying assumptions are not true; it may be that the claims settlement process has slowed down for some reason and if it is not taken into account, the projected ultimate claims cost will be an under-estimate and will produce a negative value for the IBNR estimate. Since no insurance company management consciously over-reserves for outstanding claims, it is reasonable to assume that IBNR cannot be negative. It is quite easy to verify by checking all recently settled files to see whether the insurer is truly over-providing for outstanding claims. When doing this check the practitioner should be conscious of the fact that some software programmes do not allow a payment to be booked that exceeds the existing reserve for that claim. So, the insurer may first increase the estimate and then book the payment.

For example, the following illustration shows how a slow down in claims settlement pattern can lead to serious under-reserving:

Speed of Settlement	Cumulative paid claims ratio at end of stated months							
	0 months	12 months	24 months	36 months	48 months	60 months	72 months	84 months
Normal	0%	15%	35%	50%	60%	60%	60%	60%
Slowed down	0%	5%	15%	30%	40%	50%	60%	65%

SLOWING DOWN IN SPEED OF CLAIMS SETTLEMENT
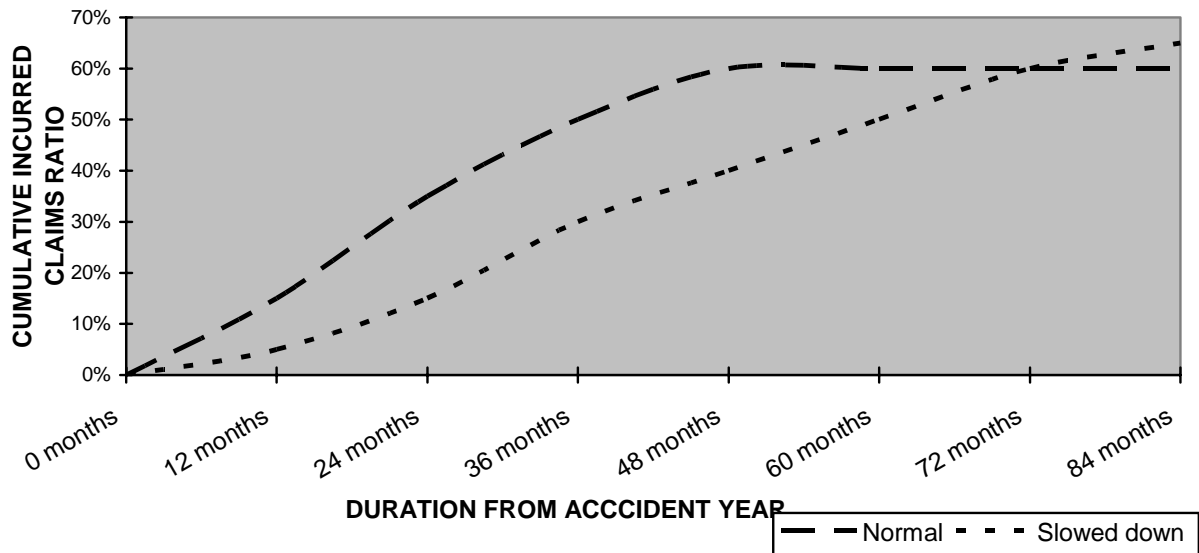
Thus we see from the above that, with a slow down, not only the tail extends but the ultimate incurred claims ratio may also increase. This is usually the case due to the below mentioned dual effect:

- When the claims manager decides to settle claims slowly, he/she loses the possibility of a lower claims cost achieved in a compromise settlement or when the claim is settled expeditiously;
- Also, with delay in claims settlement, the claims and claim related cost tend to increase – which may be due to inflation or increased court awards against the insurer and more expenses in dealing with the claim.

However, a mere fall in the claims ratio does not necessarily mean that the settlement has become lethargic. It may, on the contrary, indicate a general improvement in the claim characteristics of the portfolio. The following illustration can better explain the situation:

Improvement in Incurred Ratio	Cumulative paid claims ratio at end of stated months						
	0 months	12 months	24 months	36 months	48 months	60 months	72 months
Case 1	0%	15%	35%	50%	60%	60%	60%
Case 2	0%	12%	26%	37%	45%	45%	45%
Case 3	0%	10%	24%	33%	40%	40%	40%

EFFECT OF CLAIMS IMPROVEMENT ON TAIL
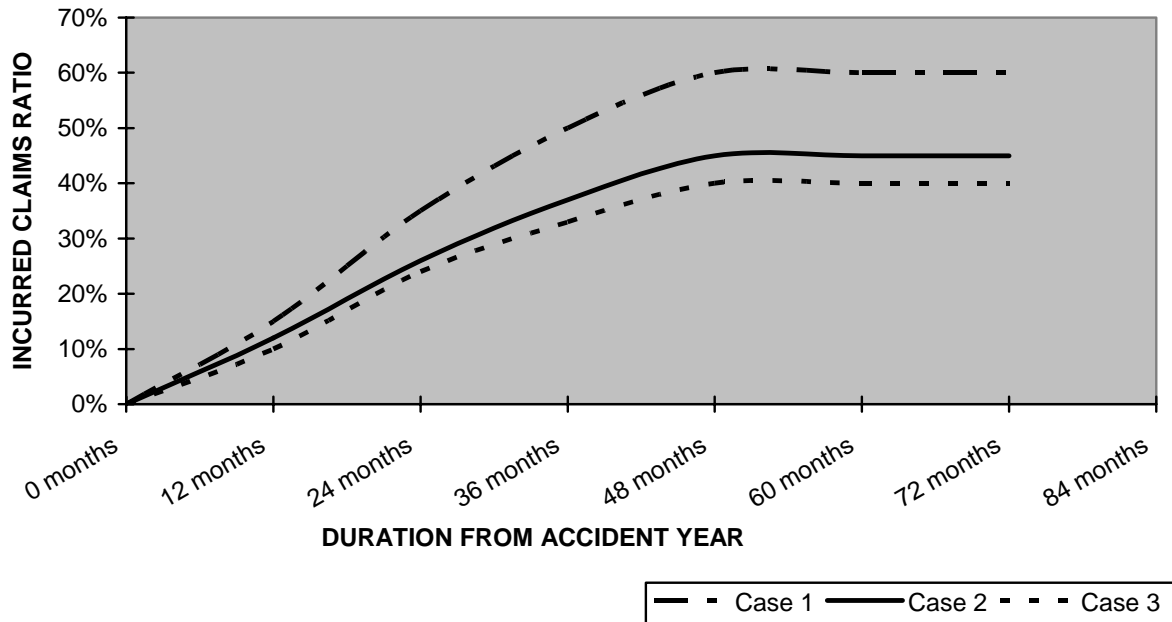
In the above case, since the cumulative claims development has flattened out in all three cases, one would look for differences in the composition of portfolio to explain the improving claims ratios. However, one should be watchful of the possibility that the insurer not only slows down claims payments but also does not provide adequately for outstanding claims.

9.7 LINK RATIO OR CHAIN-LADDER METHOD

9.7.1 Link ratio at duration "x" is the ratio of cumulative claims amount at duration "x+1" to the cumulative claims amount at duration "x".

Link ratio method uses latest year link ratios. Chain-Ladder method uses average link ratios, which are weighted by the cumulative claims values on which they are calculated. Caution should be exercised where the portfolio has changed composition or where the volume of business shows substantial variation. If link ratio method is used to calculated individual year link ratios, then the quantum of claims paid will be ignored and this may result in a variation in result for a rapidly changing portfolio.

The basic chain-ladder method is usually defined to apply to the cumulative paid claims using an accident year cohort, although it is also used for other data such as incurred claims or cohorts defined by underwriting year or reporting year.

Usually, the first accident year is assumed to have fully developed. Sometimes this will not be the case and an estimate of the expected development of claims in later development years (a "tail factor") will be required. This can be done by extrapolating the known values in a smooth curve form flattening out at the top or by assuming that the balance claims payment will be the same as the amount of outstanding claims at the most developed point.

It is possible to devise many methods that use development factors and they are therefore basically variants of the chain-ladder method.

9.7.2 Assumptions underlying the method

MANUAL FOR ESTIMATION OF PROVISION FOR IBNR AND IBNER CLAIMS
IN GENERAL INSURANCE BUSINESS

The key assumption is that, for each origin year, the expected amount of claims, in monetary terms, paid in each development year is a constant proportion of the total claims, in monetary terms, for that origin year.

No explicit assumption is made for claims inflation, but the method does build in an implicit assumption that a weighted average of past claims inflation will be repeated in the future.

9.7.3 Deficiencies

1) Assumes steady business composition
2) May not allow for changes in settlement progression
3) Ignores O/S claims data

9.7.4 When the progressive paid claims ratios show certain degree of stability, it is appropriate to use the weighted average link ratios. When the insurer's claims settlement practice undergoes a change during the period of observation, it will be reflected in the link ratios along the diagonal lines. In such a case, using the weighted average link ratios may not be appropriate. We may have to consider using the latest year's link ratios in preference to the average link ratios. If the paid claims ratio for the latest year at 12 months duration is significantly lower than the corresponding ratios for earlier years, one should enquire into the reasons for it before using the figure for projection. One should be particularly watchful if the ultimate claims ratios show a trend that is not anticipated based on analysis of management information.

9.7.5 The table and the graph below shows the calculations typically used for estimation of IBNR under this method.

Amounts in thousands Rs.

Year of occurrence	Claims paid	Duration in months from start of year					
Earned Prem		12	24	36	48	60	Estimated Ultimate
2002-03	During year	112,500	90,000	45,000	22,500	0	
	Cumulative	112,500	202,500	247,500	270,000	270,000	*270,000*
450,000	Cumulative Paid claims %	25%	45%	55%	60%	60%	*60%*
	Link ratio	**1.800**	**1.222**	**1.091**	**1.000**	60	
2003-04	During year	119,025	98,325	56,925	25,875		
	Cumulative	119,025	217,350	274,275	300,150		*300,150*
517,500	Cumulative Paid claims %	23%	42%	53%	58%		*58%*
	Link ratio	**1.826**	**1.262**	**1.094**	48		
2004-05	During year	157,950	117,000	64,350			
	Cumulative	157,950	274,950	339,300			*370,855*
585,000	Cumulative Paid claims %	27%	47%	58%			*63.4%*
	Link ratio	**1.741**	**1.234**				
2005-06	During year	157,200	144,100				
	Cumulative	157,200	301,300				*408,029*
655,000	Cumulative Paid claims %	24%	46%				*62.3%*
	Link ratio	**1.917**					
2006-07	During year	144,000					
	Cumulative	144,000					*355,306*
720,000	Cumulative Paid claims %	20%					*49.3%*
	Link ratio						
	Average Link Ratio	**1.822**	**1.239**	**1.093**	**1.000**		

Paid Claims Development
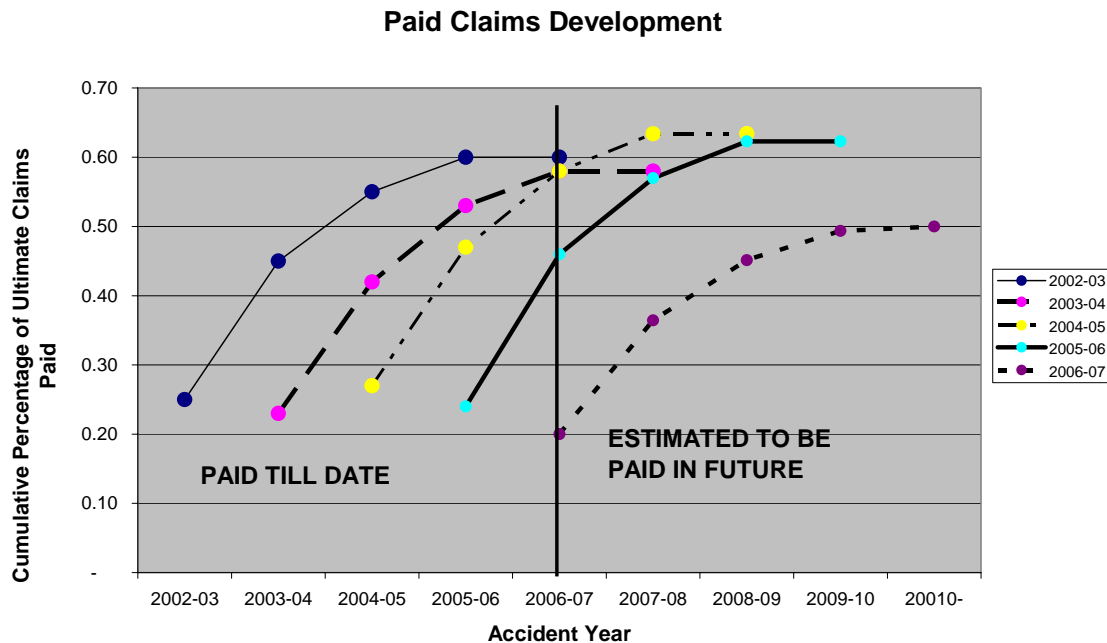
If the oldest year still has outstanding claims, we assume that those claims will settle for the amounts provided and the last link ratio will provide for it. In the above example, it is assumed that all claims for the year 2002-03 have been settled.

The much lower projected ultimate incurred claims ratio for the year 2006-07 requires enquiry before being accepted as credible. The paid claims ratio at 12 months duration has been hovering about 25%. It dropped to 20% in 2006-07. This may reflect a slower speed of settlement of claims, in which case, if there has been no change in the complexion of the portfolio, the calculated result should be over-ridden by assuming that the year will end up at 61.1%, which is the average of the earlier years' estimated ultimate claims ratios.

9.8 ULTIMATE CLAIMS RATIO METHOD

9.8.1 Using external information relating to the business, an opinion is formed about the ultimate claims ratio, which will eventually be realized. Deducting the claims paid up to date from the ultimate claims amount (Estimate), one can arrive at the balance to be provided for outstanding claims including IBNR. The provision for IBNR is the balance from this estimate after deducting the known outstanding claims.

An advantage of this method is that it is not distorted by anomalous data especially in longer tailed business. This method is also used to over-ride unacceptable estimates emerging by using other methods for years that are at an early stage of development. It should be noted that this method ignores claims data on developments so far. So, it should be resorted to only where the available data is not suitable for projection purposes.

9.8.2 Assumptions underlying the method

The assumption made under this method is that the assumed ultimate claims ratio is correct. The key to this method is the estimation of the ultimate claims ratio. This estimation may be based on:

1) Past years' developed claims ratio of that portfolio; or
2) Market claims ratio for similar portfolio of business; or

3) Considered judgment of underwriters.

9.8.3 Deficiencies

1) Too dependent on subjective factor.
2) Totally ignores claims development so far.

9.8.4 Use of this method is justified when other methods cannot be applied or when the other methods produce results that are not credible. Selection of the ultimate claims ratio is critical to this method. It will have to be derived from past experience of the portfolio for that insurer or the ultimate claims ratios for insurers with comparable portfolio of business.

9.9 Bornhuetter-Ferguson method

9.9.1 This method is similar to the Ultimate Claims Ratio method but gives credit for the claims paid until the date of provision and limits the estimation to the remaining period over which the claims are expected to develop. So, it estimates the claims expected to be paid subsequent to the date of estimation based on observed link ratios and ultimate claims ratios assumed based on other evidence and adds that estimate to the claims so far paid to arrive at the ultimate claims cost for the year.

9.9.2 The table below illustrates the use of this method.

Amounts in thousands Rs.

Year of occurrence Earned Prem	Claims paid	Duration in months from start of year					
		12	24	36	48	60	Estimated Ultimate
2002-03	During year	112,500	90,000	45,000	22,500	0	
	Cumulative	112,500	202,500	247,500	270,000	270,000	*270,000*
450,000	Cumulative Paid claims %	25%	45%	55%	60%	60%	*60%*
	Link ratio	**1.800**	**1.222**	**1.091**	**1.000**	60	
2003-04	During year	113,850	93,150	62,100	31,050		
	Cumulative	113,850	207,000	269,100	300,150		*300,150*
517,500	Cumulative Paid claims %	22%	40%	52%	58%		*58%*
	Link ratio	**1.818**	**1.300**	**1.115**			
2004-05	During year	117,000	99,450	46,800			
	Cumulative	117,000	216,450	263,250			*290,628*
585,000	Cumulative Paid claims %	20%	37%	45%			*49.7%*
	Link ratio	**1.850**	**1.216**				
2005-06	During year	117,900	91,700				
	Cumulative	117,900	209,600				*288,322*
655,000	Cumulative Paid claims %	18%	32%				*44.0%*
	Link ratio	**1.778**					
2006-07	During year	115,200					
	Cumulative	115,200					*286,984*
720,000	Cumulative Paid claims %	16%					*39.9%*
	Link ratio						
	Average Link Ratio	**1.811**	**1.246**	**1.104**	**1.000**		

9.9.3 When the calculations produce reducing estimated ultimate claims ratios, the question to be raised and answered is whether such reducing claims ratios are credible. In this case, it will be seen that the increase in earned premiums is reasonable and there is no reason to assume that the portfolio has materially changed character. This can be verified

also by discussion with the underwriters of the insurer. Assuming that rating levels have remained stable over the period, it is fair to assume that the ultimate claims ratios will also remain stable. On that basis, the results of the calculations are not acceptable.

If one compares the progression of cumulative paid claims ratios for year 2002-03 with year 2003-04, it will be seen that there is clear evidence of a lengthening tail. This trend is also visible in the less developed years. The paid claims ratios at 12 months show a steady fall over the years. This can be an indication that settlement speed is slowing down since by other indicators and information obtained from other sources about the composition and expected profitability of the portfolio, one does not expect to see a reducing claims ratio. In this situation, use of average link ratios will produce under-estimates of the ultimate claims ratios. Even if we use the link ratios of the latest development year, the estimated ultimate claims ratios will be 50.2% for 2004-05 (instead of 49.7% shown in the table), 43.4% for 2005-06 (instead of 44.0%) and 38.6% for 2006-07 (instead of 39.9%). These ratios are also not credible.

In the circumstances one can over-ride the calculated values and use 60% as the ultimate claims ratio for all the years based on the ultimate claims ratio method. Alternatively, one can apply the Bornhuetter Ferguson method and estimate the claims not yet developed using the assumed ultimate claims cost of 60%. The calculations will be as follows:

Assumed ultimate claims ratios: 60%
Average link ratios: 1.811; 1.246; 1.104; 1.000

Year	Earned Premium	Grossing up ratio	Estimated Outstanding Claims	Cumulative Paid Claims	Estimated Ultimate Claims Cost
2003-04	517,500	1.000	0	58%	58%
2004-05	585,000	1.104	60%x(1.104-1)/1.104	45%	50.7%
2005-06	655,000	1.246x1.104=1.376	60%x(1.376-1)/1.376	32%	48.4%
2006-07	720,000	1.811x1.246x1.104=2.491	60%x(2.491-1)/2.491	16%	51.9%

It will be observed that this method still does not rectify the under-estimate caused by not recognizing the lengthening tail of claims, although it does compensate to some extent for the less developed years. It is important to remember that all methods are merely means to arrive at estimates and are based on several assumptions that have not been fully verified. Hence it is not appropriate to insist on the estimate produced by any method in the face of questions relating to the credibility of the results.

9.10 PROJECTION OF NUMBER OF CLAIMS AND CLAIMS COST METHOD

9.10.1 This method deals separately with:
1. Distribution of claims settlements by year of development (Assumed to be stationary); and
2. Amount paid per claim – Which is assumed to be made up of a constant amount per claim multiplied by an adjustment factor reflecting external influences on the claim amount. The adjustment factor is considered to be constant for each year of payment regardless of the year of occurrence of the loss.

It is also called the Separation method.

9.10.2 Assumptions underlying the method

As there is no unique way of defining the method, there is no unique set of assumptions. In particular the assumptions relating to inflation will depend on the data used.

In general terms, however, there are the assumptions that for each origin year, both the number and average amount of claims relating to each development year are constant proportions of the totals from that origin year.

9.10.3 The following illustration will explain the method:

Notations:

c = constant amount per claim

γ_x = number of claims expected to be paid in development year "x" as a proportion of total no. of claims for a given year of occurrence.

λ_t = Adjustment factor for year of payment "t" reflecting external influences on claim amount

N_x = Total no. of claims expected for year of occurrence "x"

Claims Amount Data

Year of Occurrence	PAYMENT AMOUNT DURING DEVELOPMENT YEAR				
	1	2	3	4	
2002	$N_{02}\,\gamma_1\,c\,\lambda_{02}$	$N_{02}\,\gamma_2\,c\,\lambda_{03}$	$N_{02}\,\gamma_3\,c\,\lambda_{04}$	$N_{02}\,\gamma_4\,c\,\lambda_{05}$	
2003	$N_{03}\,\gamma_1\,c\,\lambda_{03}$	$N_{03}\,\gamma_2\,c\,\lambda_{04}$	$N_{03}\,\gamma_3\,c\,\lambda_{05}$	$N_{03}\,\gamma_4\,c\,\lambda_{06}$	AND
2004	$N_{04}\,\gamma_1\,c\,\lambda_{04}$	$N_{04}\,\gamma_2\,c\,\lambda_{05}$	$N_{04}\,\gamma_3\,c\,\lambda_{06}$	$N_{04}\,\gamma_4\,c\,\lambda_{07}$	
2005	$N_{05}\,\gamma_1\,c\,\lambda_{05}$	$N_{05}\,\gamma_2\,c\,\lambda_{06}$	$N_{05}\,\gamma_3\,c\,\lambda_{07}$	$N_{05}\,\gamma_4\,c\,\lambda_{08}$	SO
2006	$N_{06}\,\gamma_1\,c\,\lambda_{06}$	$N_{06}\,\gamma_2\,c\,\lambda_{07}$	$N_{06}\,\gamma_3\,c\,\lambda_{08}$	$N_{06}\,\gamma_4\,c\,\lambda_{09}$	
2007	$N_{07}\,\gamma_1\,c\,\lambda_{07}$	$N_{07}\,\gamma_2\,c\,\lambda_{08}$	$N_{07}\,\gamma_3\,c\,\lambda_{09}$	$N_{07}\,\gamma_4\,c\,\lambda_{10}$	ON

If the total amount of claims paid in each development year be divided by the total number of claims for the year of occurrence, the average claims amount paid each year will appear as follows:

Year of Occurrence	AMOUNT PAID PER CLAIM DURING DEVELOPMENT YEAR						
	1	2	3	4	5	6	7
2002	$\gamma_1\,c\,\lambda_{02}$	$\gamma_2\,c\,\lambda_{03}$	$\gamma_3\,c\,\lambda_{04}$	$\gamma_4\,c\,\lambda_{05}$	$\gamma_5\,c\,\lambda_{06}$	$\gamma_6\,c\,\lambda_{07}$	$\gamma_7\,c\,\lambda_{08}$
2003	$\gamma_1\,c\,\lambda_{03}$	$\gamma_2\,c\,\lambda_{04}$	$\gamma_3\,c\,\lambda_{05}$	$\gamma_4\,c\,\lambda_{06}$	$\gamma_5\,c\,\lambda_{07}$	$\gamma_6\,c\,\lambda_{08}$	
2004	$\gamma_1\,c\,\lambda_{04}$	$\gamma_2\,c\,\lambda_{05}$	$\gamma_3\,c\,\lambda_{06}$	$\gamma_4\,c\,\lambda_{07}$	$\gamma_5\,c\,\lambda_{08}$		
2005	$\gamma_1\,c\,\lambda_{05}$	$\gamma_2\,c\,\lambda_{06}$	$\gamma_3\,c\,\lambda_{07}$	$\gamma_4\,c\,\lambda_{08}$			
2006	$\gamma_1\,c\,\lambda_{06}$	$\gamma_2\,c\,\lambda_{07}$	$\gamma_3\,c\,\lambda_{08}$				
2007	$\gamma_1\,c\,\lambda_{07}$	$\gamma_2\,c\,\lambda_{08}$					
2008	$\gamma_1\,c\,\lambda_{08}$						

If we assume that claims are fully settled in 7 years then

$$\gamma_1 + \gamma_2 + \gamma_3 + \gamma_4 + \gamma_5 + \gamma_6 + \gamma_7 = 1$$

We total the amounts diagonally and define them as follows:

$$d_7 = \gamma_1\,c\,\lambda_{08} + \gamma_2\,c\,\lambda_{08} + \gamma_3\,c\,\lambda_{08} + \gamma_4\,c\,\lambda_{08} + \gamma_5\,c\,\lambda_{08} + \gamma_6\,c\,\lambda_{08} + \gamma_7\,c\,\lambda_{08} = c\,\lambda_{08}$$

$$d_6 = \gamma_1\,c\,\lambda_{07} + \gamma_2\,c\,\lambda_{07} + \gamma_3\,c\,\lambda_{07} + \gamma_4\,c\,\lambda_{07} + \gamma_5\,c\,\lambda_{07} + \gamma_6\,c\,\lambda_{07} = (1 - \gamma_7)\,c\,\lambda_{07}$$

$$d_5 = \gamma_1\,c\,\lambda_{06} + \gamma_2\,c\,\lambda_{06} + \gamma_3\,c\,\lambda_{06} + \gamma_4\,c\,\lambda_{06} + \gamma_5\,c\,\lambda_{06} = (1 - \gamma_6 - \gamma_7)\,c\,\lambda_{06}$$

...and so on

Since the amount in the above triangle will be known from observed data, we can derive all the values of γ_x and $c\lambda_x$ by algebra.

Values of N_x are derived by applying the Link-Ratio method to the observed number of claims progression

Values of $c\lambda_x$ for "x" after 2008 are derived from the value for $\gamma_1 c\lambda_{08}$ by using an annual increment factor.

Thus $c\lambda_{11} = c\lambda_{08} * (1+f)^3$

The method uses a great deal of arithmetic and algebra but the assumptions underlying the work makes the output no better than simple Link-Ratio method.

9.10.4 This method is not often used. The assumptions underlying this method are more difficult to establish. The method may be useful for classes of business with high frequency of loss occurrence and modest claims amounts that are quite stable. For the assumptions to hold for this method, it would be normal for them to hold also for a simpler method applying to total rather than average claim amounts, such as the chain ladder method.

9.11 <u>CRAIGHEAD CURVE FITTING METHOD</u>

Besides the quantitative methods, it is possible to use the Craighead Curve to estimate the provision required for IBNR claims. In common with all methods, this method also becomes less reliable where the number of known values to plot is two or less.

The formula for the Craighead curve is as follows:

$L(x + t) = A(x) * \{1-\exp[-(t/b) \char`\^ c]\}$

Where –

$L(x + t)$ = Actual observed cumulative paid claims ratio at duration t years for year of occurrence x;

Ax= Estimated ultimate paid claims ratio for year of occurrence x;

t = is time from beginning of year of occurrence in years;

b = parameter representing the "tail" of claims for the class of business under consideration;

c = parameter representing distribution of payments of claims over the tail period of claims settlement, i.e. speed of claims settlement.

Parameter b will have higher values where the tail of claims is longer; it will be lower for "short tail" business. For example, b will have lower value for Fire insurance or Motor OD business as compared to Motor TP insurance business.

Parameter c will have lower values where the speed of settlement is good whereas it will have higher values where it takes time for settlements to pick up. For example, c will have higher values for Motor TP insurance as compared to Motor OD business.

Let us assume the following values for parameters A, b and c:

A = 120%
b = 3.7
c = 2

For the above parameters, the Craighead curve would look like this:

Craighead Curve
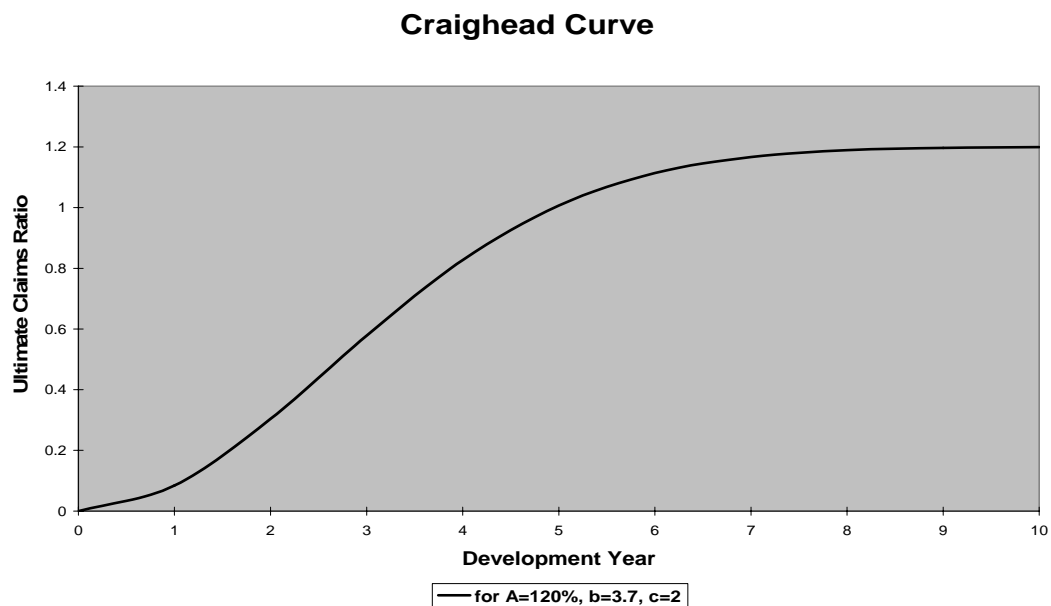
Now we shall see how the curve responds to varying speed and tail factors:

Case 1 – A and b are constant, c varies

Ax	1.2	1.2	1.2	1.2	1.2
b	3.7	3.7	3.7	3.7	3.7
c	0.25	0.5	1	2	4

**Effect of varying "c" (speed factor) on claims ratio, given the
Ultimate Loss Ratio**
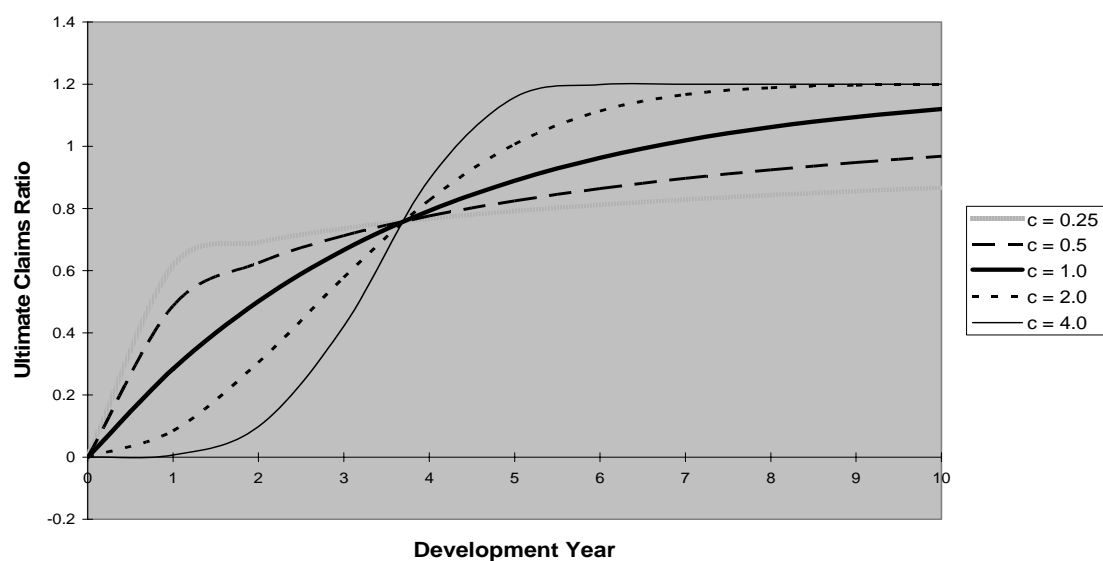
Case 2 – A and c are constant, b varies

Ax	1.2	1.2	1.2	1.2	1.2
b	1	1.5	2	3	4
c	2	2	2	2	2

**Effect of varying "b" (tail factor) on claims development,
given the Ultimate Loss Ratio**
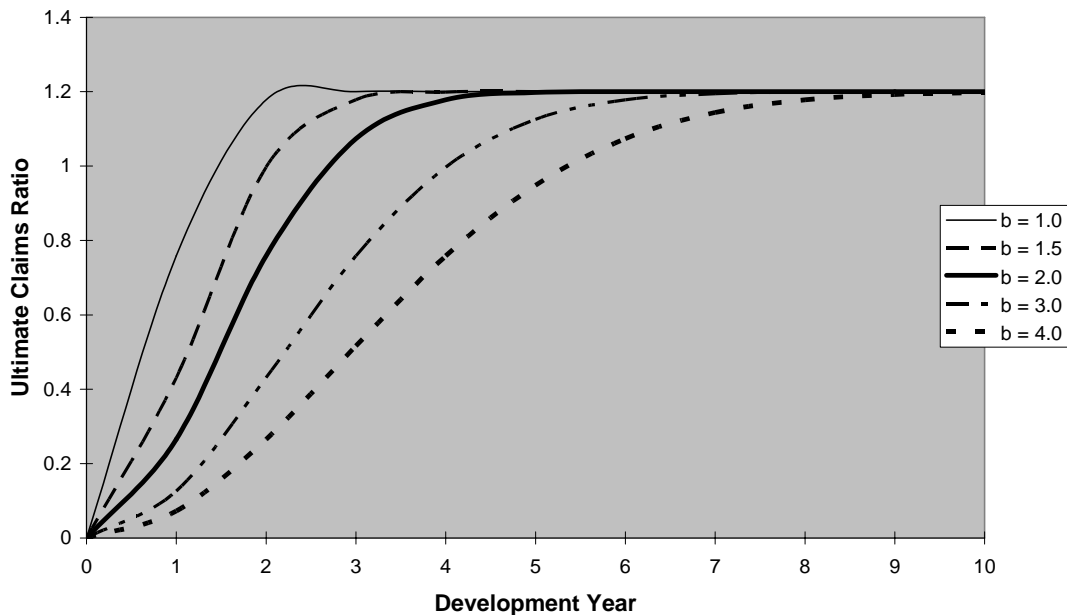
Thus we can change the values of "b" and "c" iteratively so that the curve fits the observed data as closely as possible.

The curve fitting process

The steps involved in a Craighead curve fitting exercise are enumerated here below:

Select the most developed year that can be used as the basis for the work. See if paid plus outstanding amount has stabilized over the latest two reporting dates. If so, use the cumulative paid plus outstanding ratio as at the reporting date as the value for **Ax**.

Start off with a guess. Use parameter values for b and c as follows and let the programme pick the most appropriate values as follows:

Long-tail business: **b** = 3; **c** = 3;
Short-tail business: **b** =1.5; **c** =1.5.

Calculate values of L (x + t) using the Craighead curve formula, the chosen value of Ax and parameters b and c.

Minimize the square of the differences between the observed values and calculated values of L (x + t).

Look at the progression of actual values of L (x + t) (expressed as paid claims ratios) for more recent years of occurrence following the most developed year selected. If the paid claims ratios show similar progression, then we can use the same values of parameters b and c to fit the Craighead curve to observed values of L (x + t) and achieve a good fit by varying the value of Ax. The value of Ax that gives the best fit will be the estimated ultimate claims ratio for that year of occurrence. Then IBNR will be the difference between the calculated ultimate claims cost and the recorded claims cost (paid plus outstanding) as at the estimation date.

Where the progression of paid claims ratios shows a clear shift in tail or settlement speed, parameters b and c may also require to be varied.

The estimation for the latest two years will be based on the Ultimate claims ratio method.

9.12 There are many variations of the above methods, which can be used. The weakest part of all methods is the validation of the underlying assumptions. A method is also needed to project to the ultimate claims cost based on contemporary data where we do not have data for past years.

9.12 Outstanding Claims Projection Method

The following method is not dependent on data for past years. It enables calculation of IBNR without requiring cumulative paid claims up-to-date.

Starting point:

The starting point for this method is the Year of occurrence-wise outstanding claims at the beginning of the observation period.

Observed Data:

The observed data for this method is the development of those outstanding claims into paid claims and outstanding claims at the end of each account year within the observation period.

Projection Method:

For each year of occurrence the claims paid during the year and claims outstanding at the end of the year are calculated as ratios of the claims outstanding at the beginning of the year.

Applying these ratios successively will produce the total claims paid until final settlement of all claims for each year of occurrence for the period commencing from the projection date. This total less the claims outstanding on the projection date will be the IBNR for the year of occurrence concerned.

Assumptions underlying method:

1. For each class of risk, the pattern of development of claims payments and claims outstanding is steady for each nature of claims.
2. There has been no significant change in underwriting policy over the years and that claims settlement during the observation period can be used as a guide for the future.

Firstly, we see the movement in paid and outstanding claims during the year (x+1) over year x=

$$\left\{ \frac{\text{Claims outstanding at the end of year (x+1) + Claims paid during year x+1}}{\text{Claims outstanding at the beginning of year (x+1)}} \right\}$$

To project the claims forward, we need the paid claims and outstanding claims development ratios, which are defined here under:

$O_{x+1} =$

$$\left\{ \frac{\text{Claims outstanding at the end of year (x+1)}}{\text{Claims outstanding at the beginning of year (x+1)}} \right\}$$

And

$P_{x+1} =$

$$\left\{ \frac{\text{Claims paid during year (x+1)}}{\text{Claims outstanding at the beginning of year (x+1)}} \right\}$$

The following tables illustrate the method:

An illustration: Observed Data for Account year 2008

Year of Occurrence	Claims O/s on 1.1.2008	Claims paid In 2008	Claims O/s on 31.12.2008	Development Ratios	
				Payments Px	Outstanding Ox
	(a)	(b)	(c)	(d)	(e)
				(b) / (a)	(c) / (a)
2008	----	400	1,800	----	----
2007	1,710	950	5,320	0.56	3.11
2006	5,040	2,340	8,820	0.46	1.75
2005	8,330	4,250	6,970	0.51	0.84
2004	6,560	3,200	4,320	0.49	0.66
2003	4,050	2,250	2,550	0.56	0.63
2002	2,380	1,400	1,400	0.59	0.59
2001	1,300	650	650	0.50	0.50
2000	600	300	300	0.50	0.50
1999	275	275	----	1.00	----

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Using the above observed values of P_x and O_x at different years of development, we can project the ultimate claims cost for the year of occurrence 2008 as follows:

Development Year x	Year Corresponding to development year	Claims O/s at Beginning of Development Year	Projected Development of Claims during the Development Year			
			Payments		Outstanding at the End	
			Px	Amount	Ox	Amount
		(a)	(b)	(c)	(d)	(e)
			From (d) table above	(b) * (a)	From (e) table above	(d) * (a)
2	2009	1,800	0.56	1,008	3.11	5,598
3	2010	5,598	0.46	2,575	1.75	9,797
4	2011	9,797	0.51	4,996	0.84	8,229
5	2012	8,229	0.49	4,032	0.66	5,431
6	2013	5,431	0.56	3,041	0.63	3,422
7	2014	3,422	0.59	2,019	0.59	2,019
8	2015	2,019	0.50	1,010	0.50	1,009
9	2016	1,009	0.50	505	0.50	504
10	2017	504	1.00	504	----	----

Total projected claims development From 2nd year till final settlement for Claims occurring in accident year 2008   19,690   (Total of Column (c) above)

    Less Known outstanding   1,800

          IBNR   17,890

It is important to remember when using this method that any provision included in outstanding claims figures for IBNR should be removed.

9.13 MODIFICATIONS IN CASE OF DATA AVAILABILITY FOR ONLY A SHORT PERIOD

Some comments on the approach that can be adopted when data availability is insufficient have been made in paragraphs 8 and 9.12 above. Wherever the data available is inadequate or where the data is not credible for any reason, the best thing to do is to estimate by comparison with other classes of business having a similar tail of business where adequate data is available or by reference to the results for insurers having a similar portfolio of business.

9.14 Estimation of provision for IBNR claims in mid-year

Let us assume that provision for IBNR claims has been established by the regular estimation exercise as at 31 March 2007. If we wish to establish the provision for IBNR that can be considered appropriate as at 30 June 2007, we can adopt the following approach:

IBNR as at 30 June 2007 has two components, namely:
    (i) Loss occurrences up to 31 March 2007 -
        IBNR as at 31 March 2007 continuing as IBNR as at 30 June 2007; and
    (ii) Loss occurrences on or after 1 April 2007 -
        IBNR as at 30 June 2007.

One can take the IBNR provision required for loss occurrences up to 31 March 2007 as at 30 June 2007 as the amount of outstanding claims plus IBNR provision as at 31 March 2007 *less* the amount of claims paid during the period from 1 April 2007 to 30 June 2007 or remaining outstanding as at 30 June 2007 in respect of claims recognized or re-opened till 31 March 2007.

In respect of loss occurrences on or after 1 April 2007, the IBNR provision can be taken as the estimated ultimate claims cost in respect of exposure to risk during the period 1 April 2007 to 30 June 2007 *less* the claims registered during the period 1 April 2007 to 30 June 2007, in respect of loss occurrences on or after 1 April 2007, whether paid or outstanding.

The estimated ultimate claims cost can be computed at the ultimate claims ratio as established in the IBNR calculation for year of occurrence 2006-2007, applied to the earned premium for the exposure to risk for the quarter ending 30 June 2007. The earned premium can be calculated using the one-eighth method or one-twenty-fourth method or time apportionment basis as appropriate.

If any claims of unusual size or claims by a catastrophic event have occurred in the period from 1 April 2007, they should be taken as additional to the estimate as per the preceding two paragraphs.

9.15 A NUMERICAL ILLUSTRATION:

Now we shall demonstrate how different methods can be applied to a given set of data and how results under these methods may vary due to certain characteristics of the data set and other reasons.

THE DATA:

Let us say we have the following data:

Table A

Claims paid triangle	Cumulative Claims Paid					
Accident Year	12	24	36	48	60	Claims Paid to date
2006-07	23500					23500
2005-06	14000	70100				70100
2004-05	2300	42300	69600			69600
2003-04	3700	22200	60500	78800		78800
2002-03	1600	14300	34700	49500	58500	58500

Table B

Accident Year	Claims Paid to date	O/s Claims Start of Year	O/s Claims End of Year	Incurred Claims	Earned Premium	Incurred Claims Ratio
2006-07	23500	--	157000	180500	313000	57.7%
2005-06	70100	108200	151000	221100	201000	110.0%
2004-05	69600	72100	62000	131600	122000	107.9%
2003-04	78800	64700	50000	128800	100000	128.8%
2002-03	58500	34600	48000	106500	57000	186.8%

Table C

Claims paid Numbers						Exposure
Accident Year	12	24	36	48	60	
2006-07	100					151140
2005-06	77	323				104346
2004-05	18	175	310			68540
2003-04	38	140	282	358		--
2002-03	32	98	251	318	363	--

From the above data we can deduce the following quantities:

Table D (From Table A above)

Claims Paid Link Ratios				
Accident Year	12-24	24-36	36-48	48-60
2006-07				
2005-06	5.007			
2004-05	18.391	1.645		
2003-04	6.000	2.725	1.302	
2002-03	8.938	2.427	1.427	1.182

Table E (From Tables A & B above)

Paid Loss Ratios	*Given by (Claims Paid / Earned Premium)*				
Accident Year	12	24	36	48	60
2006-07	7.51%				
2005-06	6.97%	34.88%			
2004-05	1.89%	34.67%	57.05%		
2003-04	3.70%	22.20%	60.50%	78.80%	
2002-03	2.81%	25.09%	60.88%	86.84%	102.63%

I USING LINK RATIO / CHAIN LADDER METHOD:

Using above data, we get the following weighted average of claims paid link ratios:

	12-24 months	24-36 months	36-48 months	48-60 months	60-ult (Tail)
Weighted average Link Ratios based on paid claims – table A above	6.893519	2.091371	1.347689	1.181818	1.8

We see that the year 2002-03 has not fully developed. So we need a "tail factor" to capture the development of paid claims beyond development year 5. Here we shall assume that the balance claims that will be paid over the future for Accident Year 2002-03 would be equal to the outstanding claims as at the end of year 2006-07 which is 48000. So tail factor would be (58500+48000)/58500 which is 1.820513, which may be approximated to 1.8.

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The triangle of cumulative paid claims thus fills up to:

Acc Yr	12	24	36	48	60	60-Ult
2006-07	23500	161998	338797	456593	539610	917337
2005-06	14000	70100	146605	197578	233501	396952
2004-05	2300	42300	69600	93799	110854	188451
2003-04	3700	22200	60500	78800	93127	158316
2002-03	1600	14300	34700	49500	58500	99450

Therefore, the reserve for IBNR amounts to:

Accident Year	Estimated Ultimate Claims	Claims Provided to date Incurred Claims	Total IBNR claim reserve
2006-07	917337	180000	737337
2005-06	396952	221000	175952
2004-05	188451	132000	56451
2003-04	158316	129000	29316
2002-03	99450	106000	(6550)
		Total IBNR	**992506**

Ignoring negative figures for IBNR claims reserve, we get total IBNR of **999056**.

We shall now look at figures expressing estimated ultimate claims as a percentage of earned premiums, for testing the credibility of above data:

Accident Year	Earned Premiums	Estimated Ultimate Claims In CL method	Estimated ULR
2006-07	313000	917337	293.08%
2005-06	201000	396952	197.49%
2004-05	122000	188451	154.47%
2003-04	100000	158316	158.32%
2002-03	57000	99450	174.47%

Average Estimated ULR ~ 195%	Weighted Average ULR ~ 222%

It will be seen that the entire calculations are affected by the ratio of claims paid at end of 60 months to the ultimate claims cost including the outstanding claims for the year 2002-03. The premium in that year was much smaller than in the subsequent year. Therefore, before placing total credence on the ratio to ultimate claims cost from 60 months based on 2002-03, we should look at the reasons for the outstanding claims of that year and see to what extent they are typical of the insurer's portfolio.

We should also look at the development of 2003-04 to see if it is consistent with the development of 2002-03. It will be seen that the grossing up ratio at 48 months for 2002-03 is 2.141 compared to 1.637 for year 2003-04.

So, further enquiry is called for to decide whether we should use 2002-03 as the basis for projection or move over to 2003-04 as being more typical of the subsequent years. If on enquiry we come to the conclusion that 2002-03 is not a reliable base for projection, the link ratios will change as follows:

Duration	12 months	24	36	48
Link ratio ignoring 2002-03	6.730	2.017	1.302	1.635

Using the above values, the estimated ultimate claims cost and IBNR will be as follows:

Year of occurrence	Paid claims to date	Estimated ultimate claims	Ultimate claims ratio	Recorded incurred claims	IBNR
2004-05	69,600	148,162	121.4	131,600	16,562
2005-06	70,100	300,990	149.7	221,100	79,890
2006-07	23,500	679,075	217.0	180,500	498,575
Total					595027

It should be noted that before accepting these results we should look for the logic to support the increasing claims ratios produced by the calculations. In this connection, it will be seen that the paid claims ratio at 12 months to 36 months for various years are as follows:

Claims Paid Ratio at:	2002-03	2003-04	2004-05	2005-06	2006-07
12 months	2.8%	3.7%	1.9%	7.0%	7.5%
24 months	25.1%	22.2%	34.7%	34.9%	
36 months	60.9%	60.5%	57.1%		

It indicates a distinct shift in settlements from the first 12 months to the second 12 months and third 12 months. The cumulative paid claims ratios at 36 months appear to be stable. There is a perceptible jump in the paid claims ratio at 12 months for the years 2005-06 and 2006-07. In this scenario, if we apply the average link ratios to the higher paid claims ratios of the latest two years, it will surely produce an over-estimate of the ultimate claims ratios for those years. So, this needs to be moderated after examining the nature of the portfolio and claims settlement practices.

Based on such examination, if it is found appropriate to apply the latest year link ratios instead of the average link ratios, the estimation will change as follows:

Link ratios: 5.007;   1.645;   1.302;   1.635

Year of occurrence	Paid claims to date	Estimated ultimate claims	Ultimate claims ratio	Recorded incurred claims	IBNR
2004-05	69,600	148,162	121.4%	131,600	16,562
2005-06	70,100	245,478	122.1%	221,100	24,378
2006-07	23,500	517,243	165.3%	180,500	336,743
Total					377,683

The practitioner will have to make a decision based on his study of the portfolio of the insurer and its claims settlement practices as to which basis is most appropriate.

II ULTIMATE LOSS RATIO METHOD

The application of this method is quite straightforward. For the purpose of this example, we assume a ULR of 180% as the oldest year has registered loss ratio of 182%. The result of this method is produced here below:

Accident Year	Earned Premium	Estimated Ultimate Loss Ratio	Estimated Ultimate Loss	Claims Incurred Till date	Total IBNR claim reserve
2006-07	313000	180%	563400	180000	383400
2005-06	201000	180%	361800	221000	140800
2004-05	122000	180%	219600	132000	87600
2003-04	100000	180%	180000	129000	51000
2002-03	57000	180%	102600	106000	-3400
				Total IBNR	**659400**

Therefore, ignoring the negative value, we get a reserve for IBNR claims as **662800**.

It may be noted here that ULR changes on an Accident Year basis. However, here we have taken same ULR for all years because, as seen from Table E above, the development of loss ratios seems to be more or less consistent.

III BORNHUETTER FERGUSON METHOD

Here we need the cumulative product of link ratios i.e. the grossing up factors.

Please see para 9.3 above for a description of the method.

Accident Year	Earned Premium	Cumulative Paid Claims	Recorded Outstanding Claims	Recorded Incurred Claims %	Assumed ultimate claims ratio	BF estimate of balance outstanding claims*	BF estimate of outstanding claims amount	BF estimate of Ultimate Claims %	IBNR claim reserve
2006-07	313000	23500	157,000	58%	180%	0.965	543,900	181.7	386,900
2005-06	201000	70100	151,000	110%	180%	0.767	277,543	173.0	126,543
2004-05	122000	69600	62,000	108%	180%	0.530	116,453	152.5	54,453
2003-04	100000	78800	50,000	129%	180%	0.388	69,908	148.7	19,908
2002-03	57000	58500	48,000	187%	187%	0.842	48,000	186.7	0
						Total IBNR ignoring negative values			**587,804**

* These figures represent the factor [1-1/grossing up factor] multiplying the assumed ultimate claims cost. The grossing up factors are 28.9, 4.294, 2.129, 1.635.

IV CURVE FITTING METHOD

For the above loss ratios (Table D), using the best fit, we get the following parameter values for A, b and c for each of the accident years, till the last two reporting years. For the final two reporting years, the estimated ULR is used.

	2002-03	2003-04	2004-05
A	1.834	1.312	1.207
B	5.4	4	3.7
c	1.75	2.5	2

When we obtain the best fit of cumulative paid claims ratios using the Craighead curve-fitting formula, the graphs look as shown below:
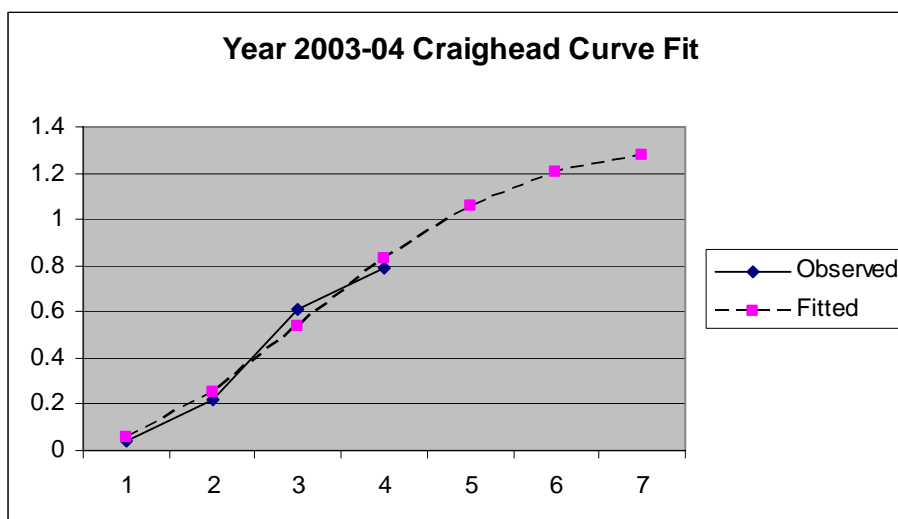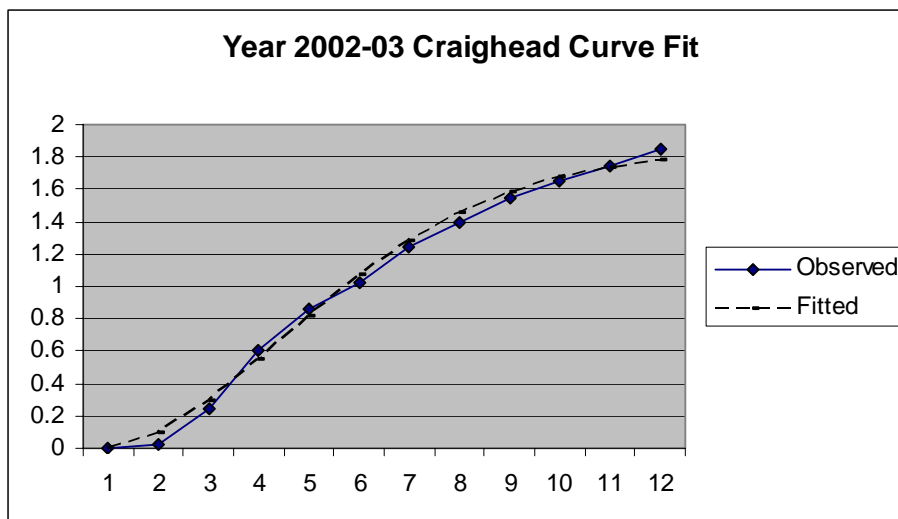
Year 2002-03 Craighead Curve Fit

Year 2003-04 Craighead Curve Fit

Year 2004-05 Craighead Curve Fit
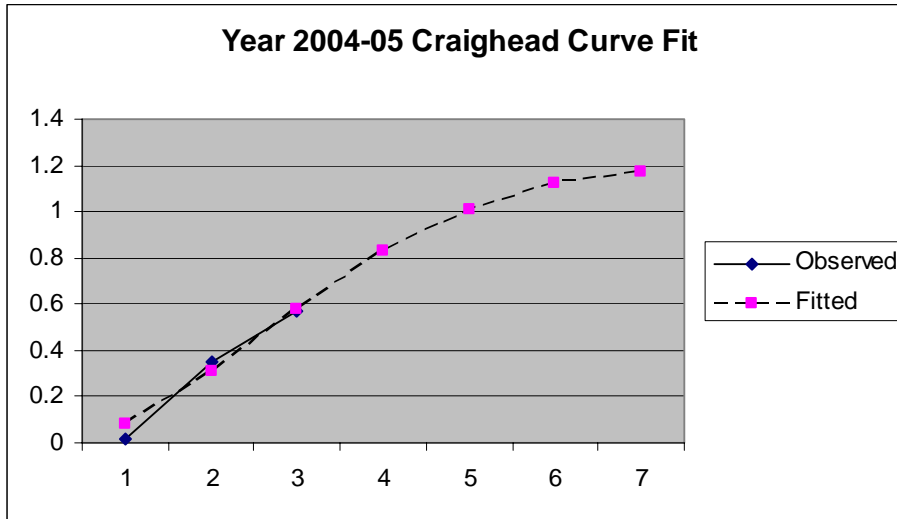
Note: In the above graphs the horizontal axis represents the year of development and the vertical axis gives the loss ratio.

The IBNR is then calculated as follows:

Accident Year	Earned Premium	Estimated Ultimate Loss Ratio	Estimated Ultimate Loss	Claims Incurred Till date	Total IBNR claim reserve
2006-07	313000	180%	563400	180000	383400
2005-06	201000	180%	361800	221000	140800
2004-05	122000	121%	147254	132000	15254
2003-04	100000	131%	131200	129000	2200
2002-03	57000	183%	104538	106000	-1462
			Total IBNR ignoring negative values		**541654**

V OUTSTANDING CLAIMS PROJECTION METHOD

Based on the methodology described in Sec.9.12 above, the IBNR claims reserve for accident year 2006-07 may be computed as follows:

Accident Year	Claims O/s on 1/4/2006	Claims paid In 2006-07	Claims O/s 31/3/07	Development Ratios Payments Px	Development Ratios Outstanding Ox
	(a)	(b)	(c)	(d)	(e)
				(b) / (a)	(c) / (a)
2006-07	0	7900	157000	--	--
2005-06	108200	18800	150500	0.1738	1.3909
2004-05	72100	48200	62100	0.6685	0.8613
2003-04	64700	21700	49900	0.3354	0.7713
2002-03	34600	14400	47600	0.4162	1.3757

Development Year	Year Corresponding to development year	Total Claims O/s at Beginning of Development	Projected Development of Claims during the Development Year			
x		Year	Payments		Outstanding at the End	
			Px	Amount	Ox	Amount
		(a)	(b)	(c)	(d)	(e)
			From (d) in table above	(b) * (a)	From (e) in table above	(d) * (a)
2	2008	157,000	0.1738	27,279	1.3909	218,378
3	2009	218,378	0.6685	145,989	0.8613	188,090
4	2010	188,090	0.3354	63,084	0.7713	145,065
5	2011	145,065	0.4162	60,374	1.3757	199,569
			TOTAL	296,726		

Total Claims Payable	496,295	(296726 + 199569)
Less Known outstanding	157,000	
Total IBNR claim reserve	339,295	(For Accident Year 2006-07)

Similarly, IBNR reserve can be calculated for other Accident Years as well. The final results would be as shown below:

Accident Year	Estimated Ultimate Payable	Known Outstanding	Total IBNR claim reserve
2006-07	496295	157000	339295
2005-06	323233	150500	172733
2004-05	106651	66100	44551
2003-04	89416	49900	39516
		Total IBNR Reserve	**596095**

A COMPARISON OF RESULTS OBTAINED FROM ALL METHODS

Method → Accident Year	Chain Ladder	C – L latest Link Ratio	Ultimate loss Ratio	Bornhuetter-Ferguson Method	Craighead Curve-fitting method	Outstanding Claims Projection Method
2006-07	498575	336,743	383400	386,900	383400	339295
2005-06	79800	24,378	140800	126,543	140800	172733
2004-05	16562	16,562	87600	54,453	15254	44551
2003-04	0	0	51000	19,908	2200	39516
2002-03	0	0	0	0	0	0
Total IBNR claim reserve	**595027**	**377,683**	**662800**	**587,804**	**541654**	**596095**

COMMENTS:

- We see from the earlier tables that the figure obtained from the Chain ladder method using data for 2002-03 produces an estimate that is quite different from those obtained from other methods. This is because the Chain Ladder method has not been modified for credibility of the ultimate claims ratio for the latest years of occurrence. This modification can only be considered after the practitioner has examined the nature of the portfolio and the claims settlement practices to guess the ultimate claims experience that can be reasonably expected. The estimate produced by ignoring the data for 2002-03 (shown above) is much smaller. BF method comes close to the estimate using the chain-ladder method ignoring data for 2002-03. Using the latest year link ratios while ignoring the 2002-03 figures produces a very much smaller estimate. In such a situation, a proper view of what is more acceptable can only be taken following a study of the evolution of the portfolio and the changes in claims settlement practices in the company.

- In the other methods, the results are greatly influenced by the chosen estimate of the ultimate claims ratio. Choice of the ultimate claims ratio to be used must be based on a proper analysis of the portfolio and the claims settlement practices of the company.

- Like all methods, the Craighead Curve-fitting method is greatly influenced by the assumed ultimate claims ratios for the latest years of occurrence.

- Thus we see that no two methods give exactly same results because of many factors, viz., different underlying assumptions, different treatment of available data in different methods and, of course, different computation methodologies. While some methods are based on data to a greater extent such as the chain-ladder method, methods like the Ultimate Loss Ratio method are greatly subjective. So, a balance needs to be struck between judgment and mathematics so that the resulting figures are credible, reliable and reflective of the underlying experience of the observed data.

- Ultimate Loss Ratio method is not the preferred method when adequate data exists. Craighead Curve-fitting method is good where there are at least two known values to project from. B-F method is only a little better than the Ultimate loss ratio method. The choice between the Craighead curve-fitting method and the two variations of the Chain-ladder method will depend on the findings of the practitioner on the portfolio composition and the way it has evolved over the period of observation and the claims settlement practices of the insurer over the period and the way it has varied. Ultimately, the financial position of the insurer will show the extent to which any error in estimation can be critical to the solvency position of the insurer. Obviously, one cannot take a lenient view where the solvency position is marginally compliant.

10 IRDA GUIDELINES ON ESTIMATION OF PROVISION FOR IBNR CLAIMS

10.1 Examination and validation of data in form A

This Form does not require a cross tally of figures because it does not capture information on changes in provisions for claims during the year.

The data in columns 2, 3 and 4 should tally with the data for the corresponding year of occurrence in columns 13 to 15 of the preceding year.

Large and Catastrophic event claims should be reported separately on this form. We should also track the development of that amount to see whether they carry any IBNR factor.

The average cost per claim outstanding (columns 2 and 3 and columns 13 and 14), average cost per claim paid (columns 7 and 8) and average cost per claim reserved (columns 9 and 10) should all be consistent.

The number of claims provided for the first time or reopened during the year (column 9) in respect of earlier years of occurrence should not be many. If they are many, the reasons must be established and their impact on the provision for IBNR claims should be assessed.

One of the reasons given by the insurers for late recognition of claims was delayed advice of coinsurance claims by the leading insurer. Although such delays are not acceptable, they do not show any adverse picture with regard to the recognition of claims by the insurer.

If the number of claims that are partly paid be significant or if the average amount per claim partly paid be significantly different from the average amount per claim paid, the reasons should be enquired into.

If the number of claims closed without payment (column 11) is large, they may be indicative of rather hasty closure of claims that may eventually lead to many claims being re-opened later. So, a high number in this column should lead to an enquiry about the claims closure practice of the company.

The average premium per policy (columns 16 and 17) should show consistency from one year to another and should also be comparable to the average for other insurers. Where the average shows a material change, it is indicative of a change in composition of the business or change in rating levels. This should be enquired into and its impact on incurred claims ratio should be assessed. In this connection, the suggestions regarding treatment of units of exposure to risk in respect of group PA or Health policies and in respect of marine open covers or policies and project insurances should be kept in view.

The totals on this form should tally with the corresponding figures as per accounts.

Adequacy of reserving can be checked as follows: The total of columns 3 and 4 less figures in columns 6 and 8 should be more than the total of columns 13 and 15.

10.2 Examination and validation of data in form B 1

There are several figures in this table that are brought forward from the previous year. These should tally with the statement submitted last year. The further progression for the current year and the outstanding claims figures should tally with the addition of the figures in Form A.

The formula for deriving earned premium should be consistently applied for all the years. The present provision of allowing 100% reserve for unexpired risks in Marine Hull

business is not technically based. So, it is better to use the 50% reserve basis even for Hull business.

The cumulative paid claims ratios should be calculated at the several durations of development. An important assumption in all projection methods is that the past is a sound basis to project the future. This should be evident in the stability of the claims paid ratios at several durations for different years of occurrence of loss. If such stability is not evident, the trend in the claims paid ratios should be interpreted. If the paid claims ratio shows a reducing trend, it can indicate a progressive improvement in claims experience or it can signify slowing down of claims settlement.

The true reason can only be established by proper enquiry. The practitioner should not accept whatever is told to him without putting the information to test of credibility. It is important for the practitioner not to identify himself too closely with the management of the insurer in order to maintain his ability to examine information provided to him in a dispassionate manner.

With the absence of tariffs, the rating level is an important indicator of the movement in profitability of the portfolio. Besides the average premium per policy, an important indicator is the average premium per thousand sum insured. The practitioner should also look at the portfolio composition by types of risks and sums insured ranges, where possible.

Unless there is sufficient evidence of improvement in the profitability characteristics of the portfolio, one should not accept the reducing paid claims ratios as proof of improved claims experience for the portfolio. The more likely cause will be the lengthening tail of claims. The practitioner should enquire about change in claims practices or personnel. It is also useful to study the average time between occurrence and recognition of claim and time between recognition and settlement. Where an insurer not only goes slow on settlement of claims but also delays recognition of claims or provides inadequately for claims, the figures will hide the true position and the calculations will not bring that out.

Negative IBNR should be looked at with utmost suspicion. Insurers do not normally over-provide for claims and unless there is strong factual evidence of over-provision, one cannot accept negative IBNR as being credible.

Where the size of the portfolio is changing materially over the observation period, weighted average link ratio will be weighted in favour of the years with larger business. If these are the earlier years, it may not represent the shape of things to come. In such an event, it may be preferable to use the latest year link ratios. Similarly, if claims settlement practices show signs of change, it may be preferable to use the latest year link ratios instead of the weighted average ratios.

10.3 Examination and validation of data in form B 2

There are several figures in this table that are brought forward from the previous year. These should tally with the statement submitted last year. The further progression for the current year and the outstanding claims numbers should tally with the addition of the figures in Form A.

In this form, we use the equivalent of earned premium to represent policy years exposed. We use the same formula as the formula for deriving earned premium. It should be consistently applied for all the years. The present provision of allowing 100% reserve for unexpired risks in Marine Hull business is not technically based. So, it is better to use the 50% reserve basis even for Hull business.

Using calculations similar to those with amounts, one can project to the estimated ultimate number of claims and thence the estimated ultimate frequency of loss occurrence. This frequency should be credible in the light of general market expectation for that class of

business and the frequency should show stability over the years for the insurer's own portfolio. If any trends are observed then investigations should be made similar to those stated above for amounts.

The estimated ultimate claims cost can be derived by multiplying the estimated ultimate frequency by the average projected amount per claim. The claims ratio using this estimate should be credible.

10.4 Examination of the Report of the Appointed Actuary

It will be observed that the form of report of the Actuary prescribed by the IRDA is such as to ensure that the actuary goes through the discipline of complete enquiry in the process of his estimation exercise. Some practitioners write the report in a style that identifies them with the management. This will deprive the Authority of the comfort that an independent practitioner has critically applied his mind to all relevant information in the estimation process. Information provided by the management should be tested for veracity before acceptance because the facts may be different from what the management believe them to be. They may sometimes convey what they think is happening while the facts on the ground may be different.

Some practitioners report information under Sections II to IV of the Report without giving any evidence that they have evaluated the information and without offering comments on the peculiarities observed and the trends in figures or unusual values. This is not satisfactory because the credibility of the report of the practitioner rests on the comfort he can provide that he has applied his mind critically to the data and the results.

As stated earlier, there are several methods for estimation of the provision for IBNR. The method best suited for a portfolio will depend on the characteristics of the portfolio. The practitioner should try to validate the findings using a different estimation method as far as possible.

10.5 Consolidation and market level indicators and some pointers on examination of data:

The IRDA plans to produce market aggregates to serve as a reference point for use of practitioners in their work. For this purpose, it is important that all the Forms submitted by all the practitioners strictly follow the Form and basis prescribed by IRDA. In particular, the practitioners should report figures only in thousands and should not change the tabulation format or sequence of columns or add to the columns. Even where a practitioner decides to work on gross basis and for reinsurance cessions separately, he should file forms A, B1 and B2 on "net of reinsurance" basis besides submitting his calculation sheets on gross basis and for reinsurance cessions.

Data for each separate accounting segment should be supplied even where the practitioner decides to adopt a different grouping for his estimation exercise. Data for Motor insurance should be shown separately for TP Liability and for Motor-Others. Where the data does not relate to 100% of the insurer's portfolio, the practitioner should give detailed explanation of what the figures represent and how they have been compiled.

Very often, the insurer's accounts package does not ensure that reinsurance cessions are recognized simultaneously with recognition of the gross amounts. This time parallax produces distortions in data especially where the magnitude of the figures is small. It also produces illogical figures in some cases. When this happens, it is necessary to correct the figures to bring in correspondence between gross and cessions before working on those figures.

The practitioner should provide explanations for any abnormal figures or any visible trend in figures without waiting to be asked. The practitioner should also comment on any claims of extra-ordinary size or claims arising from catastrophe events and whether there is any evidence of an IBNR factor in respect of such claims.

Where the number of claims closed without payment or claims of earlier years of occurrence that are recognized during the current year or re-opened during the current year are significant, the practitioner should investigate the matter and state his findings in his report. If the insurer is seen to be closing claims prematurely, it should be commented on.

The speed of emergence of claims referred to in para 2.3 of the Actuary's Report refers to the time between the date of occurrence of the event giving rise to the claim and the date of recognition of the claim. This is a useful indicator of the insurer's claims management practice and the information should be evaluated in the light of comparable data of other insurers and trend over the years within the insurer.

The ultimate claims ratio used for estimation of the recent years should be chosen very carefully and should take into account all information about the nature and quality of the portfolio of business. It should also be consistent with market experience.

The practitioner is not concerned with the adequacy or otherwise of the reserve for unexpired risks and should not modify his estimate of IBNR on that account.

Some software packages have a feature called "Auto-reserve". While this feature may be useful to set the records going, they can become a handicap if they result in the management's laxity in assessing the facts of each claim and setting up the proper reserve for the claim. The amount of auto-reserve should be comparable to the average size of claims settled.

Every estimation exercise should also extend to the study of actual emergence of claims during the current year as compared to the estimates made the preceding year.

Some practitioners produced data for "Rural insurance" separately. This makes it difficult to consolidate figures across companies. Rural insurance should also be grouped into the appropriate classes of business.

11. VALIDATION OF RESULTS AND CREDIBILITY TESTS

Validation of the data should precede the estimation exercise. Several tests have been mentioned earlier in this connection in this manual.

The most important test of credibility is the estimated ultimate claims ratios produced by the method of estimation used. Each class of business has a normally to be expected level of claims ratio. This ratio depends on the composition of the portfolio and the rating levels used. One would also expect to see the claims ratios remain steady over the years subject only to random fluctuations due to the sample size. When the calculations produce claims ratios that are significantly different from the market average or when the claims ratios show a trend in movement, the reasons for such variation should be ascertained and one should be satisfied that those reasons will produce variations such as the ones observed.

In general, reducing claims ratios should be subjected to a critical examination. As already stated earlier, negative values of IBNR should be looked at very critically since it is not a natural phenomenon.

The practitioner should validate the assumptions underlying the estimation method selected for the exercise and should cross-check the results using another method.

Each year, the practitioner should look back to the exercise carried out the preceding year and track how the actuals compare with the estimates made.

12. ESTIMATION OF IBNR FOR REINSURANCE ACCEPTED BUSINESS

12.1 There is a significant difference between the claims development on direct insurance business and that on reinsurance business in the same class of insurance business. As a general rule it can be said that the claims development in reinsurance accepted business takes longer than on direct business in the same class because the dealing with the business and claims thereon is done by the direct insurer and not by the reinsurer. This makes it necessary to adopt different and more suited methods for estimation of IBNR in respect of reinsurance accepted business.

12.2 Reinsurance business can be classified into 4 major divisions as follows:

Facultative accepted business:
        a) Proportional basis
        b) Non-proportional basis
Automatic reinsurance arrangements:
        a) Proportional basis
- Clean-cut basis with portfolio loss transfer
- Underwriting year basis with claims on run-off basis
        b) Non-proportional basis

12.3 Facultative reinsurance accepted business on proportional basis:

12.3.1 This is the closest to direct insurance business. In normal course, the ceding company has freedom to handle claims on its own. It is expected to keep the facultative reinsurers informed of claims occurrences and the subsequent developments until the final settlement. In practice, unless the direct insurer believes that the claim is not within policy conditions or there is some doubt about liability for the loss, or there is a claims cooperation clause in the reinsurance, it may not bother to keep the facultative reinsurer informed of the claim until it is ready for payment or if the amount is not large, it may inform the facultative reinsurer only when making a request for payment of the reinsurer's share of the claim.

12.3.2 So, there could be claims that are known to the original insurer but are not known to the reinsurer. Persons in the business will be well aware that requests from reinsurers for information on outstanding claims on the reinsurances accepted business bring a very weak response or no response in a majority of cases.

12.4 Facultative reinsurance accepted on non-proportional basis:

12.4.1 A further handicap with regard to acceptances on Excess of Loss basis is that the reinsurer is only interested in claims that exceed the loss retention. The variation in the excess recoverable amount is much greater than the variation in the gross claims amount. Besides, in the normal course of administration of direct insurance claims, the excess of loss claim recovery is left to be done by the Reinsurance Department and the Reinsurance Department itself does not get information on large claims promptly in many cases. This is the reason why excess of loss reinsurers started demanding notification of claims that exceed 80% of the loss retention amount in order to take early control on the recognition of claims. But, in common with normal institutional lethargy in such matters, reporting of claims exceeding 80% of the loss retention also is not prompt. So, facultative excess of loss reinsurers face significant delays in advice of claims affecting them and the estimates advised are more volatile than the original gross loss estimates.

12.5 Automatic non-proportional reinsurance arrangements:

12.5.1 These are covers that protect a portfolio of business. Excess of loss covers operate either on "per risk" basis or "per event" basis. Where they operate on per risk basis, the position is not different from facultative excess of loss accepted business.

12.5.2 Where the excess of loss cover operates on a per event basis, it will generally only be affected by catastrophe events. In such cases, there will be a few months time delay in getting a clear picture of the accumulations by the event. Besides, unlike the early estimates on property claims being higher than the eventual settlements, in excess of loss covers, the early estimates are unlikely to be larger than the eventual settlements.

12.5.3 Automatic proportional treaties operating on underwriting year basis:

These are quota share or surplus reinsurance treaties. Such treaties are accounted through quarterly accounts of reinsurance premium, reinsurance commission, and reinsurance claims paid. At the end of the accounting year, generally after the fourth quarter accounts, the ceding insurer will provide an estimate of the outstanding claims for account of the treaty. Underwriting year basis treaties deal with reinsurers for each underwriting year until all premium and claims transactions have been fully accounted to them. This involves rendering accounts to the reinsurers for a particular underwriting year for several subsequent accounting years. The accounts for the first 6 quarters will normally carry positive premiums and subsequent two or three quarters accounts will carry premium refunds. The entries for premiums will be rather small in accounts after the eighth quarter. Generally, the claims amounts in the first three quarters accounts will be small and the figures will pick up in the fourth to eighth quarter accounts and then the figures will again be small for another four or more quarters. Underwriting year-wise accounting will generally be found in respect of Marine Hull, Aviation and Engineering treaties. These classes have medium to long tail of claims development on reinsurance treaties.

12.5.4 Automatic proportional treaties on clean-cut basis:

A treaty on a run-off basis involves cumbersome accounting of reinsurance transactions with accounts being rendered to multiple sets of reinsurers every quarter. More important is the fact that in the early quarters the ceding company pays out treaty balances to the reinsurers but when the claims start getting accounted, there is no more flow of premium and the account balances tend to be negative. While recovery from reinsurers having a continuing relationship with the insurer may not present a problem, it can prove irksome to recover the amounts due from reinsurers who are no longer participating in the insurer's reinsurance business. Even the cost of collection becomes significant in relation to the amount collected. So, in order to simplify the accounting for reinsurance and maintain better control on the settlement of balances, it is common practice to adopt a clean-cut method of accounting. This involves portfolio premium and portfolio claims transfer from the reinsurers of a specified treaty year at the end of the fourth quarter accounts for that year, to the reinsurers of the next following treaty year. With this transfer, accounts are rendered to only the current set of reinsurers at any time. There are also a few treaties that may provide for only portfolio claims transfer to the next following treaty year reinsurers at the end of eighth quarter accounts. This method may be used in classes such as Hull or Aviation or Engineering as an alternative to total run-off basis of accounting.

12.6 Accounting for reinsurance:

12.6.1 Facultative reinsurance is accounted on individual transaction basis. Thus, "closing particulars" will be sent and premium settled when the original policy is issued. Thereafter, every endorsement and every claim payment is individually accounted and individually settled. There will normally be a time delay between the transaction being accounted in the ceding insurer's books and its accounting to the reinsurers.

12.6.2 Traditionally, proportional treaties are accounted for on a quarterly basis, although there may be a few cases of half-yearly accounts. It is customary to allow a 3 months time for accounting of transactions for each quarter. So, accounts for the first quarter of the year are likely to be rendered by the end of the second quarter, accounts for the second quarter by the

end of the third quarter and so on. Insurers are expected to advise the estimated provision for outstanding claims for account of the treaty as at the end of the treaty year with the accounts for the fourth quarter. However, in a large majority of cases, this estimate may not be readily forthcoming. Some ceding insurers will provide the information in response to an enquiry from the reinsurer while several others will just not respond.

12.6.3 It is normal practice to provide in the treaty agreement for immediate intimation to reinsurers of claims exceeding a specified amount. It is also normal to provide for the ceding insurer to be able to recover large claims immediately upon payment (or when payment has been finally agreed), as a "Cash loss" recovery. Such cash loss recovery requests can be sent also when interim payments are made on large claims.

12.6.4 Excess of Loss business normally provides for a deposit premium to be paid in 4 equal quarterly installments in advance to be adjusted at the end of the year based on actual premium of the portfolio protected. Claims are individually advised as soon as the ceding company determines that there will be a recovery under the excess of loss cover and the XL reinsurers' share is collected on settlement of the original claims.

12.6.5 Reinsurance transactions are generally recognized on receipt of the accounts or transaction advice. It is rare that for a treaty, all four quarter accounts of the current year get accounted within the reinsurer's accounts for the year. Generally, the company may be able to account for 3 quarters of current year and fourth quarter of the preceding year in its accounts for the year.

12.7 Year-end provisions:

12.7.1 Based on the current legal requirements, the reinsurer also provides for reserve for unexpired risks and provision for outstanding claims on the same basis as direct insurers. So, we have to bear this in mind when considering the additional provision that should be made in order not to recognize profits that are not true and to make proper provision for IBNR claims.

12.7.2 Facultative accepted business and Excess of Loss accepted business can be dealt with on the same basis as direct business for estimation of IBNR except that they will have a longer tail than direct business.

12.7.3 In respect of treaty accepted business, our objective should be to ensure that we do not recognize a higher profit on the basis of incomplete accounts than what will eventually emerge on full accounting for the treaty year concerned. So, the provision for IBNR should be such that along with the other provisions on the treaty accounts, the accounts balance does not exceed the likely ultimate profit on the treaty.

12.7.4 Where a treaty is on clean-cut basis and premium and claims portfolios have been withdrawn and profit commission has been determined, there will be no unknown liability on that treaty any more and there will be no need for any IBNR provision for that treaty. This will also be the position in cases where there is no premium portfolio withdrawal but only a loss portfolio withdrawal at the end of eight quarters, and the loss portfolio withdrawal has been made.

12.7.5 Where, in respect of a treaty providing for portfolio transfer, the portfolio entry has been accounted but the portfolio withdrawal has not been accounted, there is a need to ensure that sufficient provisions are made to avoid the profit recognized based on the accounts booked and the provisions made, being more than the profit that is expected to be realized when the portfolio is withdrawn and the accounting for the treaty year is complete. This will also be the position in respect of treaties that are accounted on run-off basis.

12.7.6 To demonstrate how the accounted figures move, an illustration is attached of the progression of accounted figures and the known provisions over successive years. Based on the ultimate profitability of the treaty, the IBNR required is shown. It is important to note that the reserve for unexpired risks makes an impact on the IBNR reserve required. It is not necessary to work out the IBNR for each treaty and for each underwriting year individually. The process can be as follows:

- Group treaties by class of business;
- Group figures by underwriting year and record cumulative figures as at end of 4 accounting quarters, 8 accounting quarters and so on till final results emerge. Isolate claims of exceptional size.

Treaty Year		TREATY ON RUN OFF BASIS ACCOUNTED FIGURES										
		Cumulative		Cumulative		Cumulative		Cumulative		Cumulative		Cumulative
		As at end	During	As at end	During	As at end	During	As at end	During	As at end	During	As at end
		4 qrs	5-8 qrs	8 qrs	9-12 qrs	12 qrs	13-16 qrs	16 qrs	17-20 qrs	20qrs	21-24 qrs	24 qrs
2002 - 03	Net premium	6,000	5,000	11,000	-1,000	10,000	0	10,000	0	10,000	0	10,000
	Paid claims	1,500	2,500	4,000	2,500	6,500	1,500	8,000	1,000	9,000	500	9,500
	Cash balance	4,500	2,500	7,000	-3,500	3,500	-1,000	2,000	-1,000	1,000	-500	500
	Res for U/E risks	3,000	-500	2,500	-3,000	-500	500	0	0	0	0	0
	Res O/S claims	1,500	1,500	3,000	-1,500	1,500	-500	1,000	-500	500	-200	300
	Bal after reserves	0	1,500	1,500	1,000	2,500	-1,000	1,000	-500	500	-300	200
	IBNR required	0		1,300		2,300		800		300		0

1. For simplification, reinsurance commission is assumed to be zero.
2. The illustration assumes that the financial accounts incorporate up to 4 quarters or 8 quarters or 12 quarters and so on. It assumes no opening reserves at inception.
3. Reserves for unexpired risks are assumed at 50% of net premium accounted during the year.
4. IBNR represents the reserve required to ensure that the profit recognized is not more than the final expected profit on the portfolio.
5. Reserve for outstanding claims are on the basis of advices received from ceding companies.

12.7.7 Based on this set of figures, one can estimate the final net profit expectation on the portfolio through extrapolation or curve fitting for each underwriting year. Use this information to calculate the additional reserve required so as not to recognize a higher profit than what is expected to emerge ultimately.

12.7.8 Where a clean-cut treaty is not fully accounted within the year, it is likely that the reinsurer accounts 3 quarters of current treaty year and 4th quarter of preceding treaty year or 2 quarters of preceding year and 2 quarters of current year. Based on the expected profitability of the business, and the accounted figures, it is possible to establish the reserve required so as not to overstate the profit in the accounts.

Notes:

1. **Annexure I** → **FORM A**

2. **Annexure II** → **FORM B1**

3. **Annexure III** → **FORM B2**

The relevant circular has been attached.

Circular No.11/IRDA/ACTL/IBNR/2005-06

8th June, 2005

To,

All General Insurers and Reinsurer,

Subject: Guidelines on estimation of IBNR Claims provision under General Insurance Business.

Ref: Circular No.08/IRDA/ACTL/IBNR/2005-06 dated 6.5.2005

This circular supersedes the circular dated 6.5.2005 under reference above.

2. IRDA (Assets, Liabilities and Solvency Margin of Insurers) Regulations, 2000 relating to valuation of liabilities for General Insurance Business require that reserve for claim incurred but not reported (IBNR) shall be determined using actuarial principles and also shall be certified by insurer's appointed actuary. In the past, it has been observed that there was no means of knowing whether the certification was supported by adequate data analysis, the methodology followed in the estimation and what factors were taken into account in the estimate of reserves. In the absence of such information it was not possible to assess the appropriateness of the estimation of the reserves for IBNR claims. It has therefore, become necessary to issue suitable guidelines in this respect which shall be followed by the General Insurers and their Appointed Actuary to enable meaningful review of such estimates by the Authority.

3. **Application**: This circular is applicable to all insurers carrying on general insurance business in India, registered in accordance with section 3 of the Insurance Act, 1938, and who will be required to furnish the statement of IBNR Reserves certified by their appointed actuaries as per Schedule II-B of the Insurance Regulatory and Development Authority (Assets, Liabilities and Solvency Margin of Insurers) Regulations, 2000.

4. **Effective date:** This circular should be followed in the estimation of IBNR reserves for the year 2005-06 and thereafter.

5. **Description**: The Annexure I to this circular describes (1) the mathematical estimation of IBNR Claim Provision; (2) the Report of the Appointed Actuary on estimation of reserves for IBNR Claims; (3) Statements that are required to be furnished to the Authority.

6. **Procedure to be followed for furnishing the Appointed Actuary's report on the estimation of reserves for IBNR Claims:** Every insurer has to make provision for IBNR Reserves in respect of its various products in different classes of general insurance business. Importance of the provision and considerations involved in this estimation have been described in Chapter 1 of the Annexure I. The stress is on past data of policies and claims, and maintenance of complete and correct data. Using the actuarial techniques, the data has to be analyzed to enable estimation of IBNR reserves. Chapter 2 describes how an appointed actuary has to complete the report. The report is required to be signed by the appointed actuary and countersigned by the principal officer of the insurer. The principal officer is responsible for providing full and accurate data in respect of policies and claims for the purpose stated above to its appointed actuary. Chapter 3 describes how to collate and present the results of the analysis for IBNR claims estimation (this includes IBNER – incurred but not enough reported)

7. All insurers and their appointed actuaries are requested to acknowledge the receipt of this circular, within 15 days from the date of receipt of this circular.

(**C S Rao**)
Chairman

Annexure I

Chapter 1

GUIDELINES ON MATHEMATICAL ESTIMATION OF
IBNR CLAIMS PROVISION

Introduction

1.1 The purpose of these guidelines is to specify an approach to the determination of IBNR in a logical manner and for compilation of data required for such determination.

1.2 These guidelines are relevant to determination of IBNR provisions for direct insurance and facultative reinsurance accepted business. Estimation of IBNR on treaty accepted and Excess Loss accepted business requires other methods more appropriate to the nature of the portfolio and its claims development pattern. Likewise, estimation of IBNR for specialized business such as crop insurance or credit guarantee insurance will require other methods more appropriate to the nature of business.

1.3 In these guidelines, the term IBNR covers both provisions for claims not reported as well as inadequate provision for reported claims, called IBNER. It is not necessary to establish separate reserves for IBNR and for IBNER so long as the method used will take into account both elements.

1.4 There are several possible methods for determination of the provision for IBNR claims. The method most appropriate in a particular case will depend on the nature of the business and claims development pattern. The method stated in these guidelines is the preferred method and is generally suitable to most sets of data. Where the Appointed Actuary considers the method stated in these guidelines to be not suitable, he should set out the reasons for such conclusion and provide justification for the alternative method proposed to be used, being considered more appropriate. Where the method used is not one of the well-known methods, the Appointed Actuary should also describe the method and the underlying assumptions in that method.

1.5 Every mathematical method of estimation is based on a set of assumptions. So, the validity of the assumptions underlying the method proposed to be used should be fully set out and validated sufficiently to lend credibility to the exercise.

1.6. Calculation of provision for IBNR should be done separately for each year of occurrence and the figures should be aggregated to arrive at the total amount to be provided.

1.7 When the **mathematics** produces a negative value for the estimate of IBNR provision for any year of occurrence, it is incorrect to automatically assume that the company is over-providing. The validity of the underlying assumptions should be re-examined. Other tests of credibility of the results should be applied. The incurred claims ratios derived after the estimation of IBNR should be reviewed in the general background of the ratios for the insurer concerned over the years and also the ratios for other insurers in the market for the same years. There should be a logically identifiable reason to support the findings. It is prudent to ignore negative values of IBNR provision.

Examination and validation of basic data

2.1 Integrity and completeness of data is essential to an acceptable estimation of IBNR provision based on such data. Therefore, an examination of the data should precede the work of estimation of IBNR provision. Although it is the responsibility of the management of the insurer to provide complete and accurate data as required by the appointed Actuary, the Appointed Actuary should apply such checks as practically possible, to ensure the quality and completeness of the data.

2.2 As suggested in the guidance note on collection of data on claims development, it is important to ensure homogeneity of data with regard to nature of business and claims

development pattern. Therefore, data should be examined separately for each of the classes set out in the guidance notes. If data of any class is aggregated with data for another class, care should be taken to see that the two classes are homogeneous in nature. In respect of Motor insurance business, it may be possible to compile data separately by class of vehicle and by scope of cover and by nature of claim. Provided the quantum of data is statistically adequate for projection work, this may be done. In respect of long-term insurance policies, the Appointed Actuary should adopt an appropriate basis to ensure that the earned premium for the year alone is used in the calculations. In respect of insurance plans including cover in more than one sub-class such as Householders' Comprehensive insurance, the system adopted by the insurer for classification of the business and the related premium should be consistently applied to data for all years used in the estimation process.

2.3 The underwriting policy of an insurer has a material effect on the nature of its portfolio and consequently, on the claims development pattern. Therefore, the Appointed Actuary should first examine the changes in underwriting policy over the period of observation and in particular, the changes made in current underwriting policy. The impact of such changes on the claims development pattern and claims ratio should be examined.

2.4 In the above context, the progression of premium over the recent years should be examined. Where the premium income shows significant fluctuation, the reasons for it should be examined. In particular, the impact of the types of risks being underwritten more actively, on the claims development should be taken into account. One of the important underwriting factors is the extent of policy deductible. If the average level of deductible has undergone material change over the recent years, its impact on the claims development should be taken into account.

2.5 In respect of motor insurance business, the composition of the portfolio by type of vehicle is material to the claims development pattern. Where the portfolio has changed materially, over recent years, its impact on the overall claims development should be taken into account unless data is split into several sub-divisions.

2.6 Compilation of data on an underwriting year basis instead of year of occurrence basis may be proposed in some cases. Where this basis is followed the Appointed Actuary should support the reason for change of basis on objective reasons.

Claims handling practices

3.1 A detailed review of the claims handling practices from the following aspects should be made. Where material changes are identified, their impact on the claims development pattern should be taken into account.

3.2 Although the law requires every claim to be recognized on first intimation, the way this is implemented in practice may differ from one company to another. The impact of inadequate provision for claims on claims development will be significant and should be taken into account.

3.3 Besides recognition of claims, the practice followed by the insurer to determine the provision to be made and the mechanism to review such provision as the claim develops are also important factors in claims development. Also, if the insurer has the practice of downsizing the claims provision in cases where there has been no movement in the claim over a certain period, it will be an important factor in claims development.

3.4 Besides studying the practice with regard to recognition, reserving and review of reserve, the claims settlement practice of the insurer should be studied. In particular, the company's practice in speed of processing for settlement, fairness in settlement offers, attitude to litigation, approach to interim payments and effectiveness of recovery action both by sale of salvage and through recoveries from third parties, are all material to the claims development pattern. For example, financial problems can get reflected in slower development of claims paid

and unless interpreted properly, they will lead to significant under-estimation of ultimate claims incurred ratios.

3.5 When studying the above aspects, it should be remembered that any set of practices that have been stable, will be reflected in the claims development pattern. Hence they may not present as much of a problem in estimation as any material changes in practices. The impact of such changes should be evaluated.

3.6 Methods that work on incurred claims are subject to far more uncertainties than methods that rely on progression of paid claims due to the uncertainties of claims estimation and reserving. Hence the Appointed Actuary should invariably work on paid claims data as the core basis of the estimation process. However, the Appointed Actuary may do another calculation using incurred claims as a point of comparison, if he so desires.

3.7 The claims development pattern can be materially affected by the occurrence of unusual events over the period of observation such as:

- Individual large claims;
- Catastrophic events causing a large number of claims;
- Changes in Law affecting the incidence and size of claims; and
- Impact of external factors on the average size of claims.

3.8 When looking at estimation of IBNR on a "net of reinsurance" basis, note should be taken of any changes in reinsurance protections and changes in size of retentions over recent years.

Allowance for trends

4.1 In order to make adequate allowance for trends, the following aspects should be studied:

(i) Composition of portfolio;

(ii) External factors such as economic environment, inflation, changes in legal, political or social conditions;

(iii) Insurer's underwriting policy; and

(iv) Insurer's claims settlement practice.

4.2 A significant indicator of claims experience is the frequency of claims occurrence and the average size per claim paid and per claim outstanding. These should be studied and any variations observed should be looked into.

Preferred method for estimation of IBNR

5.1 Based on data submitted for successive years, the cumulative development of claims picture should be compiled. It can be tabulated as shown in Form IBNR-B-1/2.

5.2 The cumulative claims paid as at the end of 24 months in respect claims relating to events that occurred in the year from 1 April 2002 to 31 March 2003 is the total of claims relating to the "current year" in the statement of claims for the year ending 31 March 2003 and claims paid in the "first preceding year" in the statement of claims for the year ending 31 March 2004; and so on. The cumulative statement is thus built up by putting together information from statements of claims for successive years.

5.3 The cumulative statement of claims development shows the way the claims paid picture develops over time. Assuming that the pattern of claims development will remain stable, it is possible to project to the completely developed claims amount using the progression of "**link ratios**" derived from the available data. The amount of IBNR will be the estimated ultimate claims cost less amounts paid so far and amount provided as outstanding on the date of estimation.

5.4 If there were changes in portfolio or underwriting or claims settlement practices, it may be better to use the latest available year's link ratios rather than the average ratios.

5.6 The estimation process should not discount the estimated future development of paid claims to the current date nor should it load the claims outstanding specifically to provide for

inflation in the future cost of claims, other than the factor already inherent in the estimation process.

Tests of credibility

6.1 The exercise of estimating the provision for IBNR will not be complete without applying the tests of credibility to the results produced. These include looking at the frequency of claims occurrence, ultimate incurred claims ratios, average cost per claim paid and per claim outstanding etc.

6.2 The ultimate incurred claims ratios for the successive years should be credible as compared to ratios of other insurers in the market and for the same insurer over time. There should be logical explanations for any variations or sharp fluctuations. If the calculations produce progressively reducing ultimate claims ratios, they indicate a deficiency of the mathematical model. It may then be necessary to over-ride the results by alternative methods such as ultimate loss ratio method or Bornhuetter-Ferguson method.

6.3 Since insurers do not normally consciously over-provide for claims and since even with utmost diligence there will be claims that have occurred but have not yet been intimated to the insurer, it is inappropriate to accept any negative values for IBNR produced by the mathematics. To avoid such an error, estimation of IBNR should be made separately for each year of occurrence. Negative values of IBNR for any year should be ignored.

6.4 An essential check on the credibility of the estimation exercise is to see how the claims developed during the preceding twelve months as compared to the projection and estimation made last year. The outstanding claims provision and provision for IBNR made at the last Balance Sheet date should be compared with the aggregate of claims paid during the year, claims provided as outstanding at the end of the year and the provision for IBNR claims produced by the formula.

6.5 Most estimation methods produce less reliable results for the most recent years. Hence the results for the more recent years have to be revised based on the Actuary's knowledge of the business, the company's portfolio and claims settlement practices and the claims ratios of other insurers in the market.

Chapter 2
REPORT OF THE APPOINTED ACTUARY ON THE ESTIMATION OF RESERVE FOR IBNR CLAIMS AS AT 31 MARCH

Name of insurer:

Name of Appointed Actuary:

Class of business:

Section I – The insurer and its business:

1.1   How active is the insurer in that class of business? Has the growth of premium income been steady and reasonable? Fluctuations in growth rates or high or low growth rates may be indicative of a change in the composition of business or changes in underwriting policy.

1.2   What is the underwriting policy of the insurer in respect of:
      i.   Selection of risks
      ii.   Rates and deductibles
      iii.   Delegation of underwriting authority.

1.3   Has the underwriting policy remained stable over the last six years? Have there been any changes in key underwriting personnel and how would that have impacted on the underwriting policy of the insurer?

1.4   What has been the claims processing and settlement policy of the insurer in the matter of:
      i.   First recognition of claim;
      ii.   Provision for a claim where no information or inadequate information on facts is available;
      iii.   Periodicity of review of the provision for a claim;
      iv.   Negotiation of bodily injury claims relating to motor accidents;
      v.   Processing and settlement of claims; and
      vi.   Pursuit of recovery or sale of salvage.

1.5   Has the claims processing and settlement policy remained the same over the past six years? Have there been any changes in key claims personnel and how would that have impacted on the claims settlement practice of the insurer? If so, comment on how the impact of these changes have been taken into account?

1.6   Has the insurer passed through cash flow or financial problems over the observation period? If so, has it affected the insurer's underwriting or claims settlement practices? Was there a significant slowing down in claims settlements?

1.7   Were the observed claims data affected by catastrophic events such as earthquake, flood, windstorm, individual large claims etc.? Were there significant changes in the business environment such as a severe economic recession that would have affected the business experience? If so, how have they affected the observed claims figures?

1.8 Was there any change in the general business and insurance industry conditions in matters such as legislative environment, competition, consumerism, levels of court awards etc.? If so, the impact of these changes should be commented upon.

Section II – The data

2.1 If the data is not separately compiled for each class of general insurance business as required by the guidance notes, then please comment on the reasons for variation.

2.2 Please comment on the source of data and steps taken to ensure that the data is consistent, reliable, complete and tallies with the audited accounts.

2.3 Please comment on the observed trends in the growth of premiums, frequency of loss occurrence, average cost per claim paid and per claim outstanding, speed of emergence of claims and speed of settlement. Please also state how these have been taken into account in the selection of the process of estimation.

2.4 Did any individually large claims affect the claims development figures? If so, how are they taken note of in the estimation process?

2.5 Is the estimation of IBNR done on a "net of reinsurance" basis? If not, describe the process followed to determine the amount to be provided net of reinsurance. Was there any material change in the reinsurance programme? If so, describe the manner in which it was allowed for in the estimation process. If data on net of reinsurance basis is not readily available, it is open to the actuary to work on the IBNR estimate on a gross basis and work on the estimate of IBNR for the share of reinsurance ceded, if that is more easily possible.

Section III – The method

3.1 Please describe the method used for estimation of IBNR. If the method used now is different from the method used previously, please state the reason for change.

3.2 Please state the assumptions underlying the method and to what extent the validity of the assumptions was verified.

3.3 Where the method used is not commonly understood, please explain the methodology and provide adequate working sheets to understand the calculations and results.

3.4 Please cross-check the result using another method, preferably, the chain-ladder method and comment on the outcome. However, if the Appointed Actuary chooses to use the chain-ladder method for estimation, then he may check on the estimate using any other method considered by him to be suitable for the purpose.

Section IV – Evaluation of the results

4.1 Please describe the tests of logic applied to the results and the results of the tests.

4.2 How do the figures of outstanding claims as per the estimation process compare with the actual provisions? If the calculated estimates are lower than the actual provisions, please advise the further tests applied to evaluate the validity of the results.

Section V

5. Comment on calculated incurred claims ratios for the insurer over the years and also as compared to other insurers in the market. In particular, please comment whether the claims ratios for the more recent years are logical. If not, please state how the estimation process was modified to achieve more credible results.

Attachments

6. The data collected from the database of the insurer, the compiled cumulative figures, the calculation sheets and the final results should be attached to the report.

Certification

7.1 The Appointed Actuary should not put forward or certify any figures, which lack credibility, with serious reservations.

7.2 The Appointed Actuary should certify that he has checked the data to the best of his ability and is satisfied that they are consistent, reliable and complete and that the assumptions underlying the method used for estimation of IBNR are valid.

7.3 The report should be signed with date by the Appointed Actuary. The Appointed Actuary should also secure a certificate from the Principal Officer as under and attach it to his report:

<div align="center">Certification</div>

I certify that full and accurate particulars of every policy and claim have been furnished to the appointed actuary: (name) for the purpose of the determination of IBNR Reserves as on the 31st day of March of   ---------.(date of investigation).

Name of insurer:

Name of Principal Officer:

Signature of Principal Officer:

Place:

Date:

Chapter 3

Statement of Claims Development during the year ending 31 March_____.

Form IBNR-A

Name of Insurer:

Name of Appointed Actuary:

Class of Business:

(All Amounts in Rupees in thousands)

Year of occurrence of loss	Provision at the beginning of year			Part payments on claims during the year		Payments on claims finally settled during the year		Claims provided for the first time or reopened during the year		Claims closed without payment during the year		Provision at the end year	
	Outstanding claims		IBNR									Outstanding claims	
	Number	Amount	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Amount	Number
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Current year													
2. First preceding year													
3. Second preceding year													
4. Third preceding year													
5. Fourth preceding year													
6. Fifth and earlier preceding Year													

11

7. TOTAL ALL
 YEARS

Signature of Appointed Actuary: Countersigned by Principal Officer

Place:

Date:

Cumulative Statement of Claims Development (By Amounts)As At 31 March_____.

Form IBNR-B-1

Name of Insurer:

Name of Appointed Actuary:

Class of Business:

(All Amounts in Rupees in thousands)

Year of occurrence	Earned Premium	Cumulative Claims Paid as at end of number of months as at Date of statement					Outstanding claims as at date of statement	Incurred claims	
		12 months	24 months	36 months	48 months	60 months		Amount	Ratio
1	2	3	4	5	6	7	8	9	10
Current year									
First preceding year									
Second preceding year									
Third preceding year									
Fourth preceding year									
Fifth preceding year									

Signature of Appointed Actuary: Countersigned by Principal Officer

Place:
Date:

Cumulative Statement of Claims Development (By Number)As At 31 March_____.

Form IBNR-B-2

Name of Insurer:

Name of Appointed Actuary:

Class of Business:

Year of occurrence	Number of policy years exposed	Cumulative number of Claims Paid as at end of number of months as at Date of statement					Outstanding number of claims as at date of statement	Incurred claims- Number	
		12 months	24 months	36 months	48 months	60 months		Number of claims	Frequency of claims
1	2	3	4	5	6	7	8	9	10
Current year									
First preceding year									
Second preceding year									
Third preceding year									
Fourth preceding year									
Fifth preceding year									

Signature of Appointed Actuary: Countersigned by Principal Officer

Place:
Date:

Instructions for filling up the Statement of Claims Development
(To Forms:IBNR-A; IBNR-B-1; and IBNR-B-2)

General
Form IBNR-A

These Statements should be submitted for the year ending 31 March 2005 and annually thereafter. It is possible that all the information required by this form cannot be readily extracted from the system as set up at present. In that case, the insurer may submit the information in the best manner possible to meet the requirement. However, effective from the year ending 31 March 2006, all the information required by these forms should be furnished in a proper manner. Insurers are advised to make necessary modifications to their software to enable them to do this in a seamless manner.

The totals of columns 3, 4, 6+8, 14 and 15 should tally with the audited accounts figures. This reconciliation is essential to ensure proper determination of IBNR provisions.

"Reporting year" means the year in respect of which the statement is prepared. Thus, the reporting year for the statement of claims development during the year ending 31 March 2005 will be the year 1 April 2004 to 31 March 2005.

It is possible that the same event in respect of the same insured gives rise to several claims. In such cases, each of these claims should be individually recognised. However, where the system treats all claims arising out of one event in respect one insured as a single claim, the same basis should consistently be followed over the period of observation. The basis used for counting the number of claims should be uniformly applied over the entire statement.

Separate statements shall be prepared for each class of business for which separate data are required as per Accounting Regulations, namely, Fire, Marine Cargo, Marine other than Cargo, Motor, Workmen's Compensation / Employers' Liability, Public / Products Liability, Engineering, Aviation, Personal Accident, Health insurance and Others. Since Motor Liability claims have a significantly different development pattern as compared to Motor Property Damage claims, data in respect of Motor business should be provided separately for Motor Property Damage and for Motor Liability business. If data in respect of any of these classes is too small to be statistically sufficient for analysis, the calculation of IBNR may be done by combining the data with a class presenting a similar claims development pattern but the data must be provided separately.

Where the insurer has sufficient quantum of information under further sub-division of data for Motor business, the insurer may collect information separately for Motor Cycles, Private Cars, Buses, Goods Vehicles, Special Purpose Vehicles such as Earth-moving Equipments, Cranes, Dumpers, Mechanical Shovels etc., and Other vehicles such as Taxis, Motor Trade Risk etc. Care should be exercised that the break up of data in the above manner does not make the data too small to be reliable as a basis of projection.

While it is open to an insurer to calculate the provisions for IBNR separately for direct business and reinsurance accepted business and reinsurance ceded business, it is sufficient for the requirements of IRDA to calculate the provision for IBNR on business net of reinsurance.

With reference to column numbers of the statement at Form IBNR-A

Column 1: Claims data should be classified according to year of occurrence of the loss. Thus, in the statement for the year ending 31 March 2005:

Current year refers to claims relating to events that occurred during the year ending 31 March 2005.

First preceding year refers to claims relating to events that occurred during the year 1 April 2003 to 31 March 2004.

Second preceding year refers to claims relating to events that occurred during the year 1 April 2002 to 31 March 2003.

Third preceding year refers to claims relating to events that occurred during the year 1 April 2001 to 31 March 2002.

Fourth preceding year refers to claims relating to events that occurred during the year 1 April 2000 to 31 March 2001.

Fifth and earlier preceding years refers to claims relating to events that occurred before 1 April 2000.

Columns 2 to 4:

Number - Column 2 relates to the number of claims provided for as outstanding at the beginning of the reporting year. Thus, in the statement for the year ending 31 March 2005, the number of claims outstanding as at 1 April 2004 will be shown in this column, duly split according to the year of occurrence of the event giving rise to the claim. In this connection, please also see para 4 of general comments above. These figures should be the same as shown in the statement for the year ended 31 March 2004 as at the end of that year, except that the references to the year of occurrence will move by one year.

Amount – Column 3 refers to the amounts provided for the claims included in column 2, also split according to the year of occurrence of the event giving rise to the claim.

IBNR amount – Column 4 refers to the amount provided as a provision for IBNR claims. If the insurer has calculated the provision for IBNR claims on an omnibus basis, then it should show the entire provision against the row for "Current year". However, insurers are advised that it is more appropriate to calculate the provision for IBNR claims separately by year of occurrence of the event giving rise to the claim and insurers who are not already doing so, should change their method of estimation to conform to this requirement.

Columns 5 and 6:

Claims where part payments were made during the reporting year but the claims are not yet fully settled should be shown in this column.

Number – column 5 can represent either the number of claims in respect of which, one or more payments were made during the year. However, where this is not possible, due to limitation of software, it may represent the number of payments regardless of the number of claims concerned. However, in either case, the basis of reporting should be consistently applied in the entire statement and in successive returns. Insurers should take up suitable modifications to software to enable the number of claims to be reported.

Amount – column 6 represents the amounts paid in respect of such claims and the direct expenses debitable as claims paid in accordance with accounting standards, such as surveyor's fees or legal fees.

Columns 7 and 8:

Claims which were finally settled during the reporting year, with no further payments either as claims or direct claims related expenses remaining outstanding, should be shown in this column. Even if several payments were made during the year, if the claim was fully settled by the end of the reporting year, all payments made in respect of such claims during the reporting year, will be shown in these columns.

Number – Column 7 can represent either the number of claims in respect of which, one or more payments were made during the year or it may represent the number of payments regardless of the number of claims concerned. However, the comments in respect of column 5 are also applicable here.

Amount – Column 8 represents the amounts paid in respect of such claims and the direct expenses debitable as claims paid in accordance with accounting standards, such as surveyor's fees or legal fees.

Columns 9 and 10:

Claims which were recognised and provided for during the reporting year for the first time, should be shown here, according to the year in which the event giving rise to the claim occurred.

Number – Column 9 relates to the number of claims that were recognised and provided for the first time during the reporting year. In this connection, please also see comments in para 4 of general comments above.

Amount – Column 10 represents the amount provided for such claims initially at the time of recognition of the claim during the reporting year. The amount of provision to be shown here will be the amount provided when the claim was first recognised. Even if the provision was revised during the year one or more times, the amount to be shown here will be the amount provided initially when the claim was recognised.

Columns 11 and 12:

Claims that were shown as outstanding at the beginning of the reporting year or were provided for the first time during the year, and were closed during the year without having made any payments during the year, will be shown here.

Number – Column 11 relates to the number of claims that were closed without any payments having been made during the reporting year.

Amount – Column 12 represents the amount that was provided as at the beginning of the reporting year (or on the date the claim was first recognised in respect of the claims recognised during the reporting year), which was written back on closure of the claim.

Columns 13 and 14:

Claims that were outstanding as at the end of the reporting year, duly classified by the year of occurrence of the event giving rise to the claim, should be shown in these columns.

Number – Column 13 relates to the number of claims provided for as outstanding at the end of the reporting year. Thus, in the statement for the year ending 31 March 2005, the number of claims outstanding as at 31 March 2005 will be shown in this column, duly split according to the year of occurrence of the event giving rise to the claim.

Amount – Column 14 refers to the amounts provided for the claims included in column 13, also split according to the year of occurrence of the event giving rise to the claim.

Column 15 – IBNR should show the estimation of provision for IBNR claims as at the end of the reporting period.

Columns 16 and 17

Information on number of policies and premiums is collected here to examine both the claims ratios and claims frequency for the class of business being studied.

Number - Column 16 will show the number of policies issued in respect of the written business for the year concerned. For example, in the statement for the year ending 31 March 2005, the figure appearing here in respect of the second preceding year will be the number of policies of that class issued during the year 1 April 2002 to 31 March 2003 and so on.

Amount – Column 17 shows the amount of premium written during the year concerned, net of reinsurance cessions.

Normally, information in columns 16 and 17 will not change in respect of the same accounting year in subsequent returns.

Where the volume of long-term policies is significant in a portfolio, the Appointed Actuary should take it into account in computing the "earned premiums" and "policy years exposed" for Tables IBNR B-1 and B-2.

Cumulative Claims Data Forms at Forms IBNR-B-1; IBNR-B-2.

Information in this statement will be compiled by aggregation of figures of claims paid shown in Claims Data Form (Form IBNR-A) for successive years. Information on number of claims will likewise be compiled as shown in Form IBNR-B-1.

In the statement as at 31 March 2005:
Claims paid as at 12 months for current year will be the claims paid during the year 1 April 2004 to 31 March 2005 in respect of events that occurred during the year 1 April 2004 to 31 March 2005;
Claims paid as at 12 months for the first preceding year will be the claims paid during the year 1 April 2003 to 31 March 2004 and as at 24 months it will be the claims paid during the period of two years from 1 April 2003 to 31 March 2005, in respect of events that occurred during the year 1 April 2003 to 31 March 2004;
And so on.