Institute of Actuaries of India

Subject SA4 – Pensions & Other Employee Benefits

November 2008 Examination

INDICATIVE SOLUTION

Q. 1) Ans (i) Discussion points on the aspects of suggested Scheme:

General Point:

In the suggested scheme design, there is integration with the EPS in the pension accrual formula. It will have different impact on low, medium and high salaried members. To make the impact clear, example of there members A,B and C has been taken who get, say Rs. 6,500/-, Rs. 13,000/- and Rs. 65,000/- per month (or say Rs. 78,000/-, Rs. 1,56,000/- and Rs. 7,80,000/- per annum) Salaries respectively. For Simplicity, it is further assumed that salaries do not increase.

Comments on each aspect of the design are as under:

a) Normal Pension Age (NPA) :-

- NPA of 60 years is satisfactory as it is probably the age at which company retires its employees.
- Sex equality which is usual in India.
- NPA under EPS is 58 so member will start getting EPS pension two years early. He may defer it for two years to earn more.
- But due to integration in company's scheme formula, his pension from the scheme will then reduce. Hence he would not like to defer.
- NPA of 60 years, therefore, has no problems

b) Pension accrual rate :-

- Integrated with EPS so that after 40 years of pensionable service, the member's total pension (including EPS pension) will be ⅔ rd of the pensionable salary.
- It is thus a reasonable pension particularly when pension increases are guaranteed.
- Avoids overprovision
- Reduces cost
- EPS pension is limited to the pensionable salary of Rs. 6,500/- per month unless the member opts to pay contribution on higher salary. Member will not opt for higher EPS pension as he shall be contributing more under EPS and at the same time his total pension may not increase due to integration.
- So members will pay contribution under EPS on Rs. 6,500/- per month salary
- Low salaried employees will be affected more than high salaried members as will be clear from the following:

  EPS pension = 40/70 x 6,500 = 3,714 per month and 150% of it is 5,571. (It is on the assumption that a person enters at age 20, completes 38 years in EPS and gets two years credit in pensionable service)

  So A's pension from scheme will be = 40/60 (6,500-5,571)

  = Rs. 619 P.M. (or 9.5% of salary)

B's pension from scheme = 40/60 (13,000-5,571)
= Rs. 4,953 P.M. (or 38%) , and
C's pension from scheme = 40/60 (65,000-5,571)
= Rs. 39,619 (or 61%)

- So accrual rate formula favours higher paid employees

c) Pensionable service :-
   - Past service not counted and so old employees will not earn much
   - For existing employees EPS pension offset will be more and so integration formula is unfavorable
   - For new employees it is usual

d) Pensionable Salary :-
   - It is not clear whether it includes variable pay
   - It is usual for the contributions but a bit unusual for the benefits
   - No EPS offset in pensionable salary so low salaried pay more whereas the benefits have such an offset and hence they do not get that much benefit (percentage wise)

e) Final Pensionable Salary :-
   - Five Year average is unusually long particularly when variable pay is only 10%
   - No dynamisation /revaluation or indexation
   - Hence benefit would be based on salary on an average of 2½ years before.
   - Under EPS final Pensionable salary is average of last 12 months and hence will be based on salary on an average of half year before.
   - Hence under EPS final pensionable salary will be of age 57.5 which will be under company's scheme also except where member's salary is above the EPS limit

f) Pension Increases :-
   - C P I guarantees are quite unusual under private company schemes
   - It makes open-ended liability for the company
   - The members may not value it to the extent it costs to the company.
   - Pension in payment is to be purchased from a life insurer and hence it will make the administration more difficult as the company /scheme has to purchase additional pension whenever there is an increase in pension due to increases in C P I index
   - Further problems if the CPI index decrease as in that case the scheme has to surrender and in doing so it may not get appropriate surrender value.

g) Employee Contributions :-

- Employee pays 8.33% of pensionable salary or Rs 6,500 per month whichever is less to EPS and 3.67% of pensionable salary under company scheme
- In the example taken for getting 67% pension from both the scheme

  A shall pay → 12% under both scheme together

  B shall pay → $\frac{\text{(3.67\% of 13,000 + 8.33\% of 6,500)}}{13,000}$

  = 7.8%

  C shall pay → $\frac{\text{(3.67\% of 65,000 + 8.33\% of 6,500)}}{65,000}$

  = 4.5%
- As there is no offset for contribution to EPS, the design raises serious inconsistency problems
- Unfaire for the members to contribute on one salary and receive benefits on another
- The design affects low paid significantly

h) Death in service lump sum :-

- 1.5 times of annual salary is low
- It is usual to be based on current salary without offset for EDLI
- Private sector schemes provide large cover and hence scheme's benefit not attractive
- For all employees such cover is valuable
- For those who are older or have some health problem, this benefit is more valuable

i) Death in service family pension :-

- Prospective service pension basis is generous for young members
- It is not clear whether EPS pension will be deducted for calculating family pension.. If deducted, then not attractive for older/low salaried members

j) Family pension on death in retirement :-

- 50% of member's pension is usual

k) Withdrawal benefit :-

- Un-revalued deferred pension is harsh for younger members
- Higher of the two makes justification

l) Early retirement benefit :-

- Unusual to give option unilaterally to retire so early which may pose problems if key workers or lots of employees leave at the same time

- 3% p. a. simple reduction is relatively generous, e.g., only 30% reduction in case of retirement at age 50
- Especially when there is guarantee of CPI indexation
- In case of EPS also reduced pension after age 50 is available with 6% p.a. reduction subject is a maximum reduction of 25%

m) Ill – health Pension :-

- Unreduced immediate pension may not be attractive for young members (who have put in shorter service)
- But O.K. in case of middle and higher aged ones who have put in longer ervice
- In case of EPS also it is unreduced immediate pension

n) Commutation :-

- Rule 90 of Income Tax Rules, 1962 allows a maximum commutation of 1/3 rd of pension if gratuity is payable, otherwise ½.
- ½ of pension commutation is against the rule and the scheme may not get approval or would be taxable above the prescribed limit.
- Fixed multiples may be a source of risk as it is an option
- But everybody opts as it is tax free

o) Late retirement Pension :-

- It is not usual to offer choice of two basis due to potential adverse selection.
- It is not clear whether member has to choose in advance or may do so at the time of actual retirement
- If member can choose at the time of actual retirement, then good for the member

Other points if any :-

- The scheme does not mention about vesting of benefits

(ii) <u>How to remedy the faults without substantial increase of cost for the company</u> :

a) Pensionable salary to be amended to incorporate an offset of 1.5 x EPS Pension :-

- Overcomes inconsistency in employee contributions
- Cost of scheme increase for the employer
- For an employee entering into scheme at age 20, the EPS will be Rs. 3,714 (as calculated in (i)). If average salary is 8 x EPS pension, then increase in cost for EPS offset will be around 0.7% {=3.67% -3.67% of $\frac{(8\ EPS-1.5EPS)}{8\ EPS}$}
- It could be passed on to members by increasing employee contribution to 4.5% of new pensionable salary
- This will reduce the percentage contribution for low paid employee which will come down to below 9% from earlier 12% for both the

schemes (i e EPS and company's) put together. It may be noted that for company's scheme contribution will be very low as for EPS itself they will be contributing 8.67%

- For high salaried it will increase which was earlier say around 4% and now it will increase to around 5%. For example, for B (getting Rs. 13,000) it will now be 8.66% from 7.8% of earlier and for C (getting 65,000) it will be 5.33% from 4.5% of earlier

b) Guarantee of CPI increase be removed :-

- Guaranteed CPI increases on pensions in payment may be changed to voluntary increase. It will remove open-ended liability for the company.
- But voluntary increases will still have the same cost if the company allows them in practice. They will also be valued so keeping same contribution rate for accounts purposes
- The employees don't value such increases much particularly if they are voluntary and hence unnecessary cost for the company
- The administrative problems will remain as it is, where voluntary increase are granted to pensioners.
- It would be better to allow small fixed increase, say 3% p.a. simple
- It will solve administrative problems and will reduce cost also so long CPI increases are above 3%
- The reduction in cost may be used for improving other benefits which are more visible to employees so the company gets value for the money
- The scheme will still be competitive as, in India, companies in private sector pay fixed pensions
- If CPI inflation is around 5%, then cost will reduce by 16% and if it is around 6%, then by 24%. If company's contribution is, say 20% then it will go down by 3% to 5%

(c) Reduce the scope of early retirement without company's consent :-

- This change reduces some potential problems for the company
- Requiring consent of employer will provide ultimate control over cost

(d) Increase reduction of early retirement, eg. 4% p. a. :-

- Will reduce the cost of early retirement pension as ultimate pension will reduce more
- Will discourage early retirement

(e) To have shorter averaging period :-

- This will bring benefits more closely linked to final salary
- Will make the scheme more costly for the company
- Moving to a 3 year averaging period could bring final salary nearer by one year
- It may increase Standard Contribution Rate (SCR) by around 5% if we

assume moderate salary inflation of 8% p. a. (=0.67(1.08) – 0.67)

- If averaging period is kept just last 12 months (which is used generally in India), then it will bring final pensionable salary nearer by two years and SCR will increase by around 11%
- If cost of scheme for company is around 20% then cost will increase by 1 to 2% by shortening averaging period from 5 to 3 or 1 respectively.

(f) Improve death in service lump sum :-

- It is attractive to employees and does not cost much as competitive terms are available in the market
- The benefit may be increased from 1½ times to 3 or 4 times.
- The cost may increase between ¼ % to ½ % of salary depending upon average age of employees (as the company is new hence average age may not be more)

(g) Ill – health Pension may be made prospective pension :-

- it will be attractive to all young and old
- The cost may not be much if definition of ill-health is sufficiently harsh
- Those who do not meet harsh definition but otherwise are ill, may be allowed unreduced accrued pension
- It will control the cost.

(h) Commutation :-

- Change maximum commutation from ½ to 1/3 rd so that scheme gets approval of commissioner of Income Tax

<u>Effect of cost under suggested changes</u> :

- Incorporation of offset of 1.5 x EPS pension together with increase in member's contribution to 4.5% will not increase cost for company
- Replacing guaranteed CPI increase by 3% fixed will reduce cost by 3% to 5% of salary
- Increasing reduction of early retirement factors will have minor effect
- Reducing averaging period to 3 or 1 year will increase cost by 1 or 2% of salary
- Death in service lump sum increase of 4 x salary will increase cost by ½%
- Ill-health pension improvement will have minor increase in cost
- commutation will not have impact
- Thus above suggested changes will be within the same cost. May be cost will be lower which reduction can be considered in allowing past service benefits for the existing employees.

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Q. 2)
Ans

Need for values: Values will need to be placed on benefits requirements and future contribution intentions in order to check whether these match up and so determine an appropriate level of contribution. At the outset a valuation is required to;

- Calculate the level of contribution needed to aim for a certain target level of benefits and/or,
- Estimate the level of benefits that may be provided by a certain level of contributions.

Also from time to time the contributions will need to be reviewed in the light of actual Developments

Changes in the individual circumstances can radically affect the premises underlying the original funding pattern whilst economic factors such as salary and price inflation or the rate of return on the assets will affect the cost of providing the benefits.

During the period up to retirement regular valuations to review the position are necessary. The frequency of valuations is likely to increase as the individual gets nearer to retirement.

The valuation may either;

- Check and in the light of actual experience possibly revise current contribution levels so that the fund is on track to maintain the original target benefits or,
- Calculate new contribution levels to deliver a revised target level of benefits.

Changes in personal circumstances can affect both the target benefits, as personal needs change, and the ability to make contributions, as financial circumstances change.

It is important to review an individual arrangement regularly so the contribution rates can be changed in good time.

2 (b):

Indicative Solution:

Many, though not all, of the actuarial assumptions made will be different for such advice compared with assumptions for a valuation of an approved superannuation scheme

For example;

i Pre-retirement investment return may be lower because of greater proportionate expenses and any guarantees given,

ii Post-retirement investment return will be the same as the anticipated assumption of the life office expected to insure the pension at retirement,

iii General salary inflation is likely to be in line with average expected with industry or economy,

iv A promotional scale is likely to take account of the individual's own expectations,

v Mortality and other decrements before retirement would be ignored,

vi Post-retirement mortality would be as expected to be assumed by the insuring life office at retirement,

vii Marital assumptions are likely to be inline with the actual situation at the time of advice.

2 (c):

Indicative Solution:

The common aims of most of the accounting Standards that aim to achieve are;

- Recognizing the realistic costs of accruing benefits,
- Avoiding distortions resulting from fluctuations in the flow of contributions from the employer to the pension scheme,
- Consistency in the accounting treatment from year to year (although not necessarily from company to company),
- Disclosure of appropriate information.

The problems that might occur if the reported cost was stated to be the contribution paid to the scheme;

- If the actual contributions paid fluctuate, the reported cost, and therefore company profit, will be volatile even though the true cost of the benefits accruing might be stable.
- The cost would be deliberately manipulated to try to increase reported profit which could depress security of benefits through inadequate contributions.
- Different companies might be advised by different actuaries, giving rise to different contributions to meet the cost of the same benefits, unless the accounting standards required the use of a prescribed method and assumption.
- Over time, funding advice could change eg a different method and/or

assumptions might be used, giving rise to misleading trends in profit.

2 (d):

Indicative Solution:

The four fundamental accounting concepts are;

Prudence – Provision is not made for revenues until their ultimate realization is reasonably certain. Provision is made for all known liabilities.

Ongoing – It is assumed that the business is not going to be wound up (unless it is).

Accruals – Costs are recognized when they are incurred rather than when they are actually paid.

Consistency – There is identical accounting treatment of like items from year to year, or if there is not, the change is disclosed and effect shown.

i The method of calculating pension costs: With the exception of actuarial gains and losses, the elements of the pension cost calculation under IAS 19 are;

The current service cost plus (+) interest cost less (-) expected return on assets plus (+) past service cost – the liability arising due to benefits improvement can be amortized over the period until the benefit vests, less (-) gain (losses) on settlements or curtailments plus (+) actuarial gains or losses (if the company has decided that gains or losses should be amortized through the income statement, rather than being passed through the Statement of Recognised Income and Expenses).

The actuarial gains and losses -

Prior to 1st January 2005, only one method of allowing for gains and losses was permitted, namely the 10% corridor approach. From 1st Jan 2005 an optional alternative method was introduced. IAS 19 now offers companies a choice of approaches in respect of the treatment of actuarial gains and losses arising from experience and change in assumptions.

ii The method of calculating the amount to be recognized in the balance sheet

The present value of defined benefit obligation

plus (+) Actuarial gains or (less) losses not yet recognized in the pension cost,

less (-) Any outstanding past service costs not yet recognized in the pension costs,

less (-) the fair value of scheme assets.

If the result is an asset then it should be limited to the present value of;

the available future refunds of surplus (valued using the discount rate),

plus (+) the available reduction in future contributions (valued using discount rate),

plus (+) any outstanding actuarial losses or past service costs not yet recognized in the pension costs

Thus there is cap as to the amount of surplus that can be allowed for under IAS 19.

1. The full list of disclosures required under IAS 19 are;
2. the accounting policy for recognizing actuarial gains and losses,
3. a general description of the type of the scheme,
4. a reconciliation of assets and liabilities recognised in the balance sheet,
5. any self-investment included in the fair value of scheme assets,
6. a reconciliation showing the movements in the period in the net assets or liability recognized in the balance sheet,
7. the pension cost charges against the company's assets consisting of current service costs, interest costs, expected returns on scheme assets, actuarial gains or losses, past service costs or any curtailment or settlement costs.
8. the actual return on scheme assets,
9. the principal actuarial assumptions,
10. the amount recognized outside the profit and loss account, separately showing actuarial gains and losses and effect of any limits laid down by IAS 19,
11. cumulative gains and losses recognized outside the profit and loss account,
12. assets split in to major categories,
13. explanation of how the expected return is derived,
14. five year history of asset values, liabilities, surplus/deficit, and experience gains and losses,
15. expected contributions over the coming year,
16. explanation of any constructive obligations (e g to provide regular pension increases)

2 (e)

i) Indicative solution: In the case of DB schemes covered under Group Gratuity or other DB scheme with an insurance company where the actuarial risks and investment risks have not been transferred from the enterprise, the actuarial valuation certificate provided by the insurance company can be relied upon by the enterprise.

However the enterprise should ensure that such actuarial valuation has been carried out by a qualified Actuary in accordance with AS 15 (rev.2005), the underlying data is accurate, the assumptions are appropriate, the information required for compliance with the disclosure requirements of the Standard have been provided by the insurance company. A separate certificate from another qualified Actuary is not necessary.

ii) Indicative Solution:

In this case the employee's right to receive the benefit is conditional on future employment for a period of five years. Although there is possibility that the benefit may not vest, there is also a probability the employee would serve for the minimum period of five years and become eligible for gratuity. An obligation exists even if the benefit is not vested. The obligation arises when the employee renders the service though the benefit is not vested. The measurement of this obligation at its present value takes in to account the probability that the benefit may not vest and this appropriately factored in the calculation of the present value of the defined benefit obligation. An enterprise should, therefore, create a provision in respect of gratuity payable during the first five years of service of an employee.

iii) Indicative Solution:
Enterprises to which AS 15 was applicable were required to comply with the provisions of the Standard in the preparation and presentation of the financial statements. In case an enterprise had not created a provision for retirement benefits as per the earlier Standard, the amount of benefits as at the commencement of the financial year when the AS 15 (rev.2005) is first applied would be a prior period item as it represents an omission in the preparation of the financial statements of the earlier periods. The amount of such benefit should be charged to the profit and loss account in the period when it is first accounted for and should be dealt with in accordance with AS 5. The enterprise would not be entitled to use the transitional provisions of the AS 15 (rev.2005) to account for such under-provisioning.

iv) Indicative Solution:
The transitional provisions of AS 15 (rev.2005) can be applied to only those items where the AS 15 (rev.2005) requires recognition and measurement for the first time and to changes in principles of recognition and measurement in the AS 15 (rev.2005) as compared to AS 15. The transitional provisions can not be utilized to recognize or provide for errors in measurement based on AS 15 for the periods in which the Standard was applicable. Such errors in measurement based on AS 15 should be dealt with in accordance with AS 5.

v) Indicative Solution:

The inputs and the process involved in applying the Black's Model for valuing the interest rate guarantee are as follows:

Inputs:
The inputs required for using the Black's model are as follows:

1. the Gilt Yield Curve [the zero coupon yield curve applicable to Government of India Bonds] as on the valuation date1
2. The investment return earned on the assets backing the PF Accumulation for five to ten years immediately preceding the valuation date
3. The current guaranteed rate of return ,which is typically equal to the rate of return declared by the Employees Provident Fund Organization [EPFO]
4. The PF accumulation as on the Valuation Date
5. The expected working life time of the members of the exempt provident fund as on the valuation date
6. The demographic assumptions related to decrements such as future attrition rates and mortality rates
7. The discount rate which is equal to the market yield on Government bonds [on the balance sheet date] .The term of the Government bonds must be equal to the decrement adjusted expected working life time of the employees

Process:
The following steps are involved in applying the Black's Model for valuing the interest rate guarantee embedded in an exempt provident fund:

1. Obtain the continuously compounded Zero Coupon gilt yield curve [as on the balance sheet date] over the "decrement adjusted" expected working lifetime of the members of the exempt provident fund.
2. Derive the one-year forward rates from the Zero-coupon yield curve obtained in the previous step.
3. Adjust the one-year forward rates for the yield spread between the

portfolio rate of return and the yield on the gilts of an appropriate term. The portfolio rate of return refers to the rate of return on the asset portfolio backing the PF accumulation.

4. Determine an appropriate volatility parameter for the spread adjusted one-year forward rates. This parameter can be estimated as the standard deviation of the historical rates of return on the asset portfolio backing the PF accumulation.
5. Project the guaranteed rates of return based on the recent rate declared by the EPFO
6. Use the Black's Model for estimating the value of the floorlet for each year of the decrement adjusted remaining working life time. The value of the floor will be equal to the sum of the values of the floorlets.
7. The PVO [Present Value Obligation] of the Interest Guarantee is equal to the value of the floor.

2 (f)
Indicative solution:

Key elements of the GN 20 on the Actuarial Practice for Social Security Programmes;

Scope of the GN 20 –

1 Type of program
The GN 20 covers Social Security Programmes (SSPs) having the following attributes:
(a) Prescribed by legislation such as Employees State Insuran Corporation, Social Security schemes for specific class of the population set l Central or State Governments.
(b) Covering a defined wide population, generally on a compulsory automatic coverage basis. (1/4 s)
(c) The benefits provided by the SSP are generally payable in respect of o or more of: old age, retirement, death, disability, invalidity, survivorship, healt sickness, maternity, unemployment, work-related injuries.

2. Type of actuarial work

- Actuarial reports on the projected financial status of an SSP or equivalent reports
- Statements of opinion, papers or presentations on SSP policy matters, such as the adequacy of contributions and/or benefits relating to the existing provisions, or proposals for changes therein, or establishment of a new scheme.

3. Principles

In producing actuarial work with respect to SSPs the actuary should comply with the following principles:

1. Scientific rigour

The actuary should ensure that the methodology used for the long-term financial projections is based on actuarial principles. The actuary should comply with any general or specific professional guidance that may apply in the relevant circumstances. The actuary should also ensure that the calculations accurately reflect the methods and assumptions adopted. In this context, the actuary should indicate in the report that assumptions, though reasonably determined, are not predictions and that eventual differences between future experience and the report's assumptions will be analysed and taken into account in subsequent reports.

2. Objectivity

If the determination of assumptions used for demographic and financial projections is part of the actuary's mandate, he/she should ensure that they are determined without inappropriate political or external influences. If the actuary is not mandated to determine the assumptions but they are set by another entity, and whenever external work is relied upon in the determination of assumptions, the actuary should state the origins of the assumptions and, when needed to give a fair view of the SSP, show a sensitivity analysis of the impact of alternative assumptions.

3. Transparency, explicitness, simplicity and consistency of the information supplied in the report.

When preparing a report, a paper or a presentation the actuary should aim to communicate as clearly as possible, having regard to the various audiences to whom it is addressed and the different stakeholders who will place reliance on the results. The actuary is accordingly recommended to include in the report an executive summary written in plain language, describing the purpose and the main findings of the report.

4.Avoidance of relative judgment

While carrying out a project and preparing the actuarial report, it should be ensured that no element of condescension is reflected in the report and that the state of affairs of the client is not commented upon with reference to any other client's or entities' state of affairs, unless such comparison is part of the frame of reference of the assignment. In the latter case such comparison should be objective and devoid of relative judgment.

5. Information to be included

Actuarial reports on SSPs should include or make reference to all relevant a material information taking into account the purpose of the report and to who it is addressed. The content of an actuarial report varies depending upon t nature of the actuarial work involved. Therefore the detailed lists of informati in this section are only illustrative. The following general list applies mo specifically to reports on the projected financial status of an SSP or equivale reports.

6. Assumptions

The assumptions should be set according to the purpose of the investigation. Normally for an SSP, assumptions are expected to be determined on:

- A best estimate basis. In case there is need to build in prudence over the best estimate, then the degree of such prudence should be specified.
- Each assumption should be individually set.
- An explicit, as opposed to implicit, basis to the extent possible.
- A basis taking into account:
    (i) Internal consistency, e.g. all assumptions should be mutually consistent by virtue of their correlation or interrelationship.
    (ii) Overall consistency, e.g. the economic and demographic assumptions used should be consistent with the long-term experience and the outlook for the economy.

7. Methodology

The methodology employed for the financial projections should be described in a manner that provides sufficient information for another actuary or other person with relevant expertise to assess the results of the report.

2 (g)

i) Indicative Solution:

Assessing the value of insurance;

Whether to insure or not is an investment decision for the trustees and they should be mindful of the trust law/s which requires them to act as prudent person of business The decision should be taken after consultation with the sponsoring employer, since it's the employer who meets the cost of insurance premium and/or death benefit.
In deciding whether or not to insure a particular benefit, trustees of a pension scheme should consider the following;

- Is insurance available,
- How certain is the cost of benefit? If certain, then all the scheme needs to do is to pay the cost. If it is uncertain, how much it is likely to vary?
- If the cost is uncertain, how serious is it for the scheme if the cost is larger than expected? If the consequences are serious, the scheme is much more likely to insure than if the result of excess cost is minor.
- If the insurance is available how expensive is it? The relevant cost comparison here is of insurance premium with expected cost of the benefit together with the perceived value of the reduction in volatility.

In assessing the risks and rewards, the Actuary can place a realistic estimate on the value of benefits.

Values will also need to be placed on the range of likely benefit costs so that an assessment of the risk can be made in comparison to the cost of insurance.

Accounting Standards may state as to how these costs should be valued.

ii) Indicative solution:

Experience rating: This is generally used to refer to the use of scheme's past mortality experience in deciding whether it is appropriate to adjust the unit rate up or down from that derived using standard rates of mortality.

Profit Sharing: This is used to refer to the situation in which the insurer will take account of the scheme's actual mortality experience during a year of cover. A scheme that has made little in the way of claims would receive a year end premium refund, whilst a scheme that has made higher than expected claim may be required to pay an additional premium.

iii) Indicative solution:

The Scheme protects itself against;

- Lower than expected post-retirement mortality,
- Lower than expected investment return,
- Higher than expected expenses.

iv) Indicative Solution:

The surplus arising during the year can be determined by comparing the surplus at the start and end of the year.

The analysis involves breaking down this surplus in relation to the elements

of experience that have deviated from the expectations. The complexity of this process is dependent on the number of elements of experience that are subject to deviation.

However, it is usually possible to remove some of these elements from the analysis on the grounds of financial insignificance. It is likely however the number of potentially significant elements is sufficient to lead to considerable interaction between elements and a decision needs to be taken as to how surplus resulting from more than one element of surplus should be allocated in the analysis. There is no single correct way in which the analysis should be done.

It is usual to start by investigating the effect of assumptions that are expected to have the greatest financial significance. The analysis of some of the minor elements may then be seen to be unnecessary.

The economic assumptions are often those that have the greatest financial significance. However, the economic assumptions may be very significant if they relate to events that lead to a significant difference in the value of the benefits that are payable.

At all times, when carrying out an analysis of surplus, it is important to consider the "overlap" between different factors. Care should be taken not to double count any aspects or to leave things out accidentally. Once an item has been analysed, all subsequent calculations are based on the EXPECTED values of that item, to avoid double counting.
Appropriate values also vary depending on the funding methods use. (1/4 s)
The funding method dictates the size of the actuarial liability and the implied contribution rate. A surplus is defined as the excess of assets over the actuarial liability ie not necessarily the excess of assets over the past-service liability.
The attained age funding method tends to produce surplus. It will produce surplus even when all the assumptions are borne out because AASCR exceeds the value of benefits accruing.

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