

12th Global Conference of Actuaries

Financial Reporting Controls within an Actuarial Department of a Life Insurer

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Caveats:

a) The views and opinions expressed are those of the authors and do not necessarily represent the views and opinion of their past or current employers.

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Importance of Actuarial Financial Reporting

- Non-unit mathematical reserves one of the largest item on the b/s
- When companies break even – change in reserves will be one of the largest determinants of profit
- Increasing need to demonstrate internally and externally results are correct e.g. Senior management, audit committee, tax authorities, investors, equity analysts, IRDA, policyholders ...
- Professionalism

Practical Difficulties

- Year-end time compression to meet Consolidated Group accounts timelines?
- Data still being aggregated from rural branches and so not given to Actuarial until 4th April or later?
- Other insurance company departments (Ops, IT) understanding?
- Sufficiently experienced actuarial staff available (and UK exams end of April)?
- New products being launched near year-end for the end of year rush?



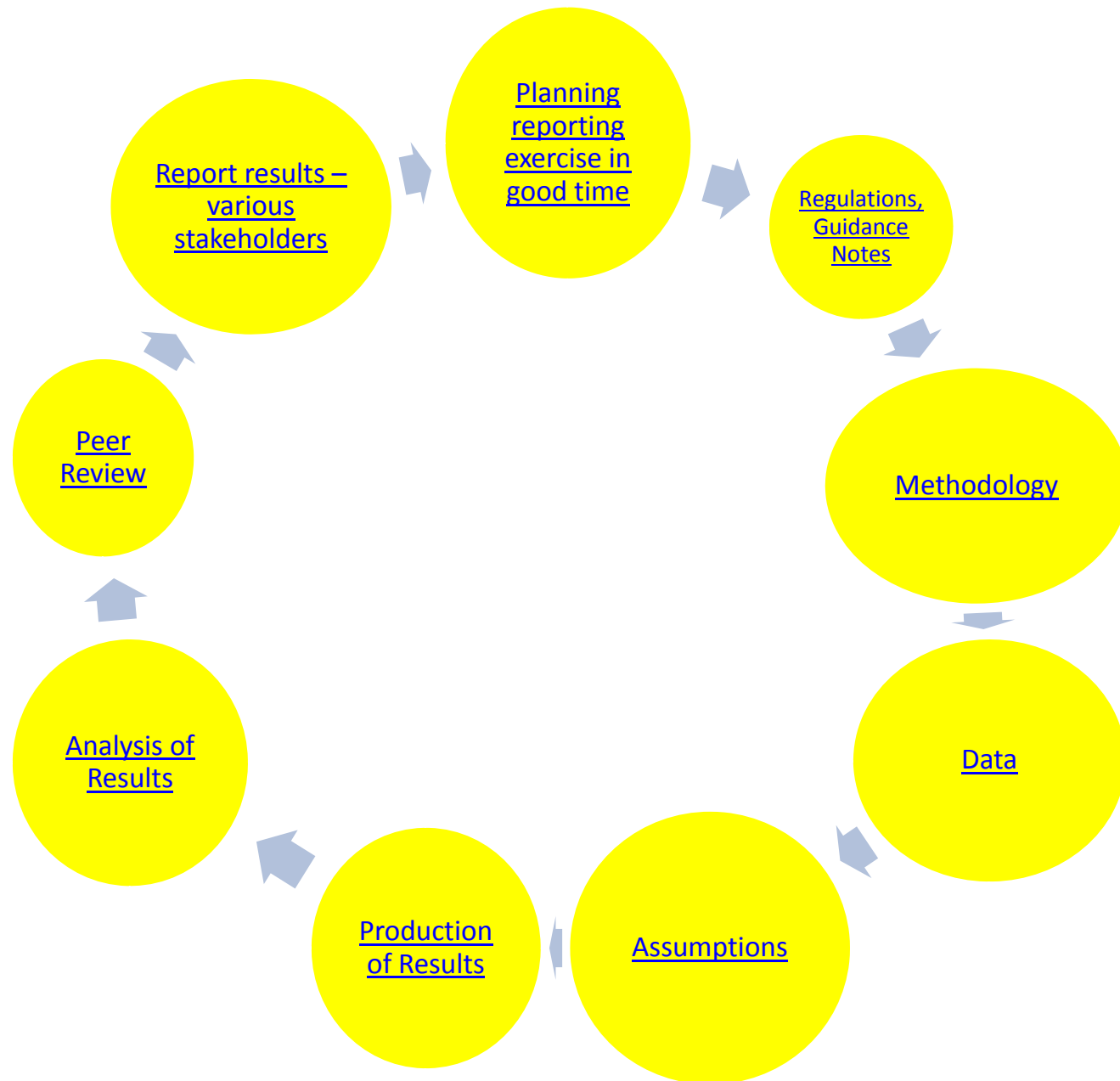
Controls Framework Cycle – UK Working Party

- Risk assessment - identify key inherent risks within the actuarial processes
- Process documentation - understand and document key steps in the processes
- Design controls over the inherent risks in each process documented above
- Reporting and evidencing - Key control indicators and periodic testing
- Revise and improve – remediate control deficiencies

Implementation steps of Controls Framework Cycle

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Planning - Project Management

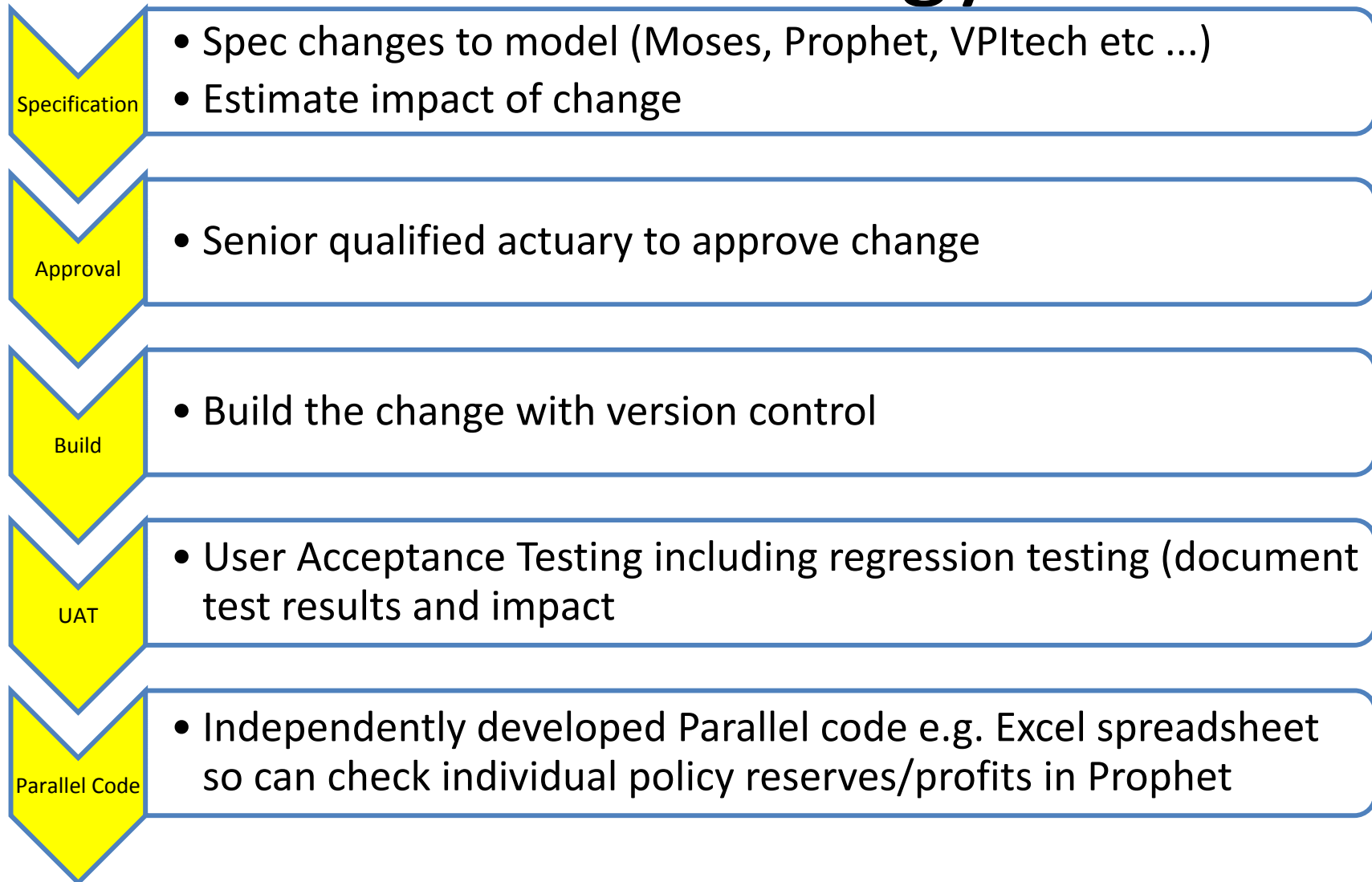
- Plan a yearly calendar - quarterly results becoming increasingly important
- Split major actuarial activities into individual Projects to give them independent focus
- Change Request Management – scope (take up material changes), estimation and schedule management, decision to involve external consultant, resource management
- Manage the execution risk of the Project actively e.g. include adequate buffer in the plan based on predictability of activities

Example Planning Timeline for Year-end

- 31 Jan
 - Experience Analysis up to 31 Dec completed
 - Change freeze on all model development
- 28 Feb
 - Peer Review report prepared inc methodology for determining investment assumptions
 - Valuation carried out under a number of scenarios to understand policy portfolio sensitivities and check MAD appropriate
- 31 Mar
 - External Peer review work and discussion occurred
- Apr
 - Obtain data, perform valuation, present results



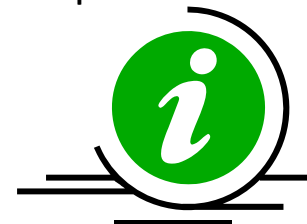
Methodology



Potential iterative process if unexpected results from UAT

Data

- Completeness check – data structure of policy administration system (PAS), how do you know you have correct data e.g. today's premium or yesterday's premium, all policies statuses?
- How many PAS do you have – one for individual contracts, one for group, one for pending claims?
- Produce tracking of movements (by product and rider (DDD forms))
- Reconcile actuarial data to other sources e.g. deaths have a financial payment – check to trial balance, revival/reinstatement payment of late fee, check lapses to MIS or even work loads in Operations area to sense check result
- Sample check some policies to the PAS and original documents
- Validation program – check premium rates, unreasonable ages, combinations, date formats, policy boundary conditions – ideally with threshold just below b c to test your validation program (which is also version controlled),
- Have trend in average changed by product e.g. average premium, average sum assured, average age, average gender, average duration in force, average outstanding term
- Regular on-going interaction with Operations and IT – every change in PAS should be assessed for impact on reporting
- Continue checking the data at each step e.g. policy data output from Prophet should be same as data downloaded from PAS except for known required changes



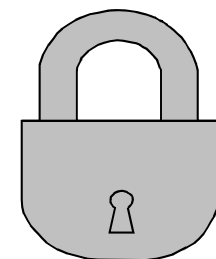
Assumptions

- Best estimate of own experience or pricing assumptions – how validate that assumptions are not unreasonable?
- When carrying out experience analysis do you use full rigour in data analysis –
 - check completion,
 - cross check with other users of data their understanding of data eg reinstatements – is your data consistent with the manpower levels for the Ops reinstatement team,
 - programs for calculating exposure to risk etc. have undergone version control
- Lapse assumption – is more or less lapses prudent?
- Are the assumptions in the correct format for the model ?
- Inevitably setting assumptions requires exercising judgement – have you documented this analysis?
- Is there an Assumption Management process in place? - a process of ensuring that only assumptions approved by Appointed Actuary are used in (Prophet) Runs e.g. a central repository of assumptions maintained to use same set of assumptions in all the runs, an audit trail of all the assumption changes



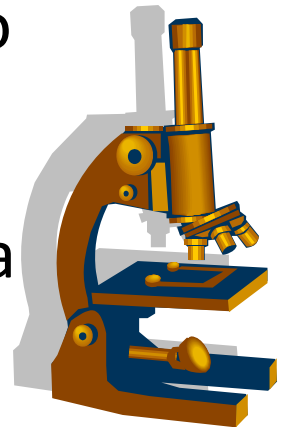
Production of Results: Are the controls in your organisation strong enough to ensure “what can go wrong will not go wrong”

- Have staff obtained the correct copy of the data?
- Is data getting “lost” in the valuation process?
- Can the wrong version of the calculation engine be used
- Can the wrong results be picked up from the output of the calculation engine?
- Are there any intermediate steps which involve manual work eg cut and paste data, running other programs etc
- Is it possible to extract your summary results from a different file from the summary of the data?
- Is their maker/checker on the input of assumptions into the model?
- Can new products get missed?
- Additional reserves – since added afterwards are they complete and checked
- Can staff accidentally or deliberately change intermediate data or code?
- If IPO, results are very financially sensitive information - are controls in place such that only those in the actuarial team who need to see the final results see them?
- Do you have maker/checker at all ‘vulnerable’ points?
- Are results output in a document with location of file, date (and time) of file etc.?



Analysis of Results

- Do the numbers look consistent with previous quarter's results?
- For existing business can you roll forward previous year's results to this year
- Are trends not unreasonable e.g. Reserves/Premium, Reserves by SA – may need to consider by cohort
- Analysis of Surplus carried out to check sources of surplus are as expected
- DDD/tracking of movements completed to ensure no policies missing – all policies issued should have a meaningful status even if expired.
- Calculation of reserves checked on parallel code for a sample number of policies



Regulations, Guidance Notes and Peer Review

- Regulations
 - The Insurance Act 1938
 - The Insurance Rules 1939
 - Insurance Regulatory and Development Authority (Appointed Actuary) Regulations, 2000
 - Insurance Regulatory and Development Authority (Assets, Liabilities and Solvency Margin of Insurers) Regulations, 2000
 - IRDA circulars e.g. on ARA and AAAR issued in Jan/Feb of each year, solvency margin calculations
- Guidance Notes
 - GN1 - Appointed Actuary and Life Insurance Business
 - GN2 - Additional Guidance for Appointed Actuary and Actuaries involved in Life Insurance
 - GN4 - Peer Review
 - GN 7 Appointed Actuary (AA) and Principles for determining Margins for Adverse Deviation (MAD) in Life Insurance liabilities
- Peer review – has peer reviewer given final comments based on actual results

Report Results – various stakeholders

- Results to Finance – sent by junior after verbal ok by AA or AA send them by email and follow signed version to mitigate mix-ups?
- Is process for calculating ASM and RSM different or output as part of reserves calculation?
- Are results output in IRDA reporting format or do they need to be compiled and represented?
- Is Form I for bonus and tax purposes completed at the same time or later?
- Do colleagues in Finance understand what is sent to them – how do you know?
- When do you receive the signed Principal Officer's Certificate that complete and accurate data has been given to the AA - after the Board meeting?



Production Environment

Why do you need it?

- Are your reporting results produced in an environment in which
 - Members other than the authorized Reporting Team can modify the data, model or signed-off assumptions
- Can your Reporting Actuary be sure or prove to auditors that there are no unintentional or intentional changes to data, model or assumptions?
 - Is the sign-off by the Reporting Team members sufficient proof?
- In addition, how is Reporting Actuary sure that
 - Security of confidential policy data is not jeopardized (at all times)
 - Application security and audit standards in Actuarial Services dept. is at the same level as the other functions within your organisation
- Your Actuarial Reporting should be produced in an environment
 - That provides answers to the above questions
 - Further, that it applies to all the applications used for Reporting

What is a Production Environment?

- Definition: A **secure** environment on server where only the **right users** have access to the **right applications** (models) to produce results and perform analysis
- The inputs come from PAS without user intervention and through secure mechanism
- A process exists to use approved models and assumptions to produce results
- The authorised Reporting Team has access to Prophet (other modelling software) only to run it to produce results and subsequently to analyse it
- Only approved users can take the data/results in and out of the environment
- Exception process exists that allows model corrections with an approved process and with sufficient audit trails so that
 - The results can be replicated. It further means no overwriting of results
 - The reporting actuary can review and sign-off on the exceptions
- An environment in which the application security and audit standards of the organisation are met
 - It may mean building additional security wrappers over and above 3rd party applications

Production Environment Implementation

- All the Access Control implementation by one team i.e. IT
- IT performs the initial setup of environment based on a checklist that is prepared by Reporting users
 - IT receives all the objects (model, programs, excel spreadsheets) from Prophet Modelling and Reporting Team and sets up an environment based on a jointly defined Release Note
- At the time of initial setup, a tool (run by IT) takes snapshots of all the programs and data files in the environment.
- This is compared with another snapshot after the completion of reporting runs to check that none of the programs and data have been intentionally or unintentionally modified/overwritten
- The comparison is signed-off by the Reporting team leader
- Post sign-off, the setup (with data, model, assumptions and results) is moved by IT to a read-only secure location for future reference and replication

Production Environment Implementation (...cntd)

- NT File System Setup. IT setups
 - A designated folder structure so that the replication is easier
 - NT file permissions such that only the authorized reporting users can access the production folders
- 3rd Party Modeling Application – For example Prophet
 - Use 3rd Party Access Control features to implement access control. Again managed by IT
 - Audit trail of each of the run is kept
 - Overwriting of runs is not allowed
 - In case overwriting is required the overwritten output is also saved with the reason of overwrite and necessary audit trail
 - 3rd party applications may further require (eg Parallel PC runs) solution to NT file system share so that the Production environment does not become open to other users
 - “Run As” feature allows the share not to be accessible

Production Environment Implementation (...cntd)

- 3rd Party Application Access Control – Like DCS
 - Build a Access Control application so that only authorized users can access DCS
 - Only the DCS executable are setup so that no modification is possible
 - The input data, assumption tables remain read-only
 - Well defined process so that output of DCS directly becomes input to Prophet
- Excel Spreadsheet Control
 - Each of the spreadsheets are password protected with only the authorized users having access to it
 - Further in each of the printout the audit trail of the spreadsheet is printed
 - Reduce the usage of spreadsheet as much as possible
 - It is not a recommended application for Application Security

Other Aspects

- Documentation
 - Meaningful and helpful
 - Data
 - Calculation Method
 - Process
 - Results –including location
 - Solvency II requirement
- Audit – Work should be auditable even if there is no audit -yet
- Replicability – can you replicate the results a month later?
- Retention Period – 6 to 8 years
 - Data
 - Models
 - Results
- Replicate – even if disaster occurs – eg back ups on a remote site eg Mumbai actuarial office and copy back up kept in Chennai



Other Enablers

- Internal Audit carrying out a review of the actuarial process and calculations (eg with external consultant help on technical aspects)
- IRDA actuarial inspection is helpful as best practice can be disseminated to industry
- Those with joint venture partners with appropriate expertise can ask the joint venture partner to carry out a technical review
- Consultant Actuaries review

Professional Guidance

- UK Report from the Actuarial Processes and Controls Best Practice Working Party – Life Insurance – May 2009
- USA – Actuarial Standards Board – Actuarial Standard of Practice No 23 Data Quality
www.actuarialstandardsboard.org/pdf/asops/asop023_097.pdf
- Canada -Actuarial Standards Board , Standards of Practice s1530 Data et seq
www.actuaries.ca/SOP_Doc/Complete/SOP_e_Complete_October_09.pdf
- Singapore - **Guidance Note for Appointed Actuaries on Valuation of Policy Liabilities for Life Insurance Business SAS GN L02**
www.actuaries.org.sg/files/library/guidance_notes/GNL2_post%20EGM_final.pdf?download
- UK Board for Actuarial Standards (exposure drafts)
 - Data
 - The use of poorly documented and unchecked data is a significant threat to the production of reliable actuarial information and to actuarial quality
 - Documentation – contain enough detail for a technically competent person with no previous knowledge to understand the matters involved and assess the judgements made; include a statement of its purpose; and be clear unambiguous and complete for its purpose
 - Data requirements shall be assessed whenever actuarial information is required
 - Documentation shall include the definitions of all items of data
 - Validation – a set of checks shall be constructed and performed in order to determine whether to no, taken overall, the data is sufficiently accurate, relevant and complete for the actuarial information that depends on it to meet the needs of the user. Documentation shall include the objectives of the checks that have been performed and records of the outcomes of the checks

– Modelling

- The use of poorly documented and poorly understood models , or models that are not known to be fit for purpose, is a significant threat to the production of reliable actuarial information and to actuarial quality
- Documentation – contain enough detail for a technically competent person with no previous knowledge of the model being documented to understand the matters involved and assess the judgements made; include a statement of its purpose; and be clear unambiguous and complete for its purpose
- Models shall represent all phenomena that are relevant to their purpose , taking into account their structure
- Models shall be no more complex than can be justified
- Documentation shall include statements of the assumptions used in a model
- Implementations and realisations of models shall be reproducible
- A set of checks shall be constructed and performed in order to determine the fitness for purpose of the theoretical construct, implementation and realisations. Documentation shall include a) the objectives of the checks that have been performed and b) records of the outcome of the checks
- If an aggregate report includes information based on models it shall include explanations of a) any material limitation of the models and their limitations and b) how the models on which it is based address the users' needs

– Reporting Actuarial Information

Equity Funding Corporation – The Billion Dollar Bubble

1973 - collapse of the Equity Funding Corporation of America, top 10 life insurer in USA, with an estimated \$2 billion fraud.

The top management wished to inflate earnings so that they could benefit via trading their securities at high prices.

Three major stages:

inflated earnings phase - inflating income with bogus commissions supposedly earned through loans made to customers

the foreign phase - the company acquired foreign subsidiaries and used these subsidiaries in complex transfers of assets

the insurance phase- involved the resale of falsely created insurance policies to reinsurance companies to solve its short term cash problems. A program was written to generate policies coded "Class 99."

Fraud persisted for nearly 10 years before a disgruntled employee whistle blew

sjjx.znufe.edu.cn/jxzy/aljx/200704/P020070429018677265387.pdf

courses.mgmt.dal.ca/comm4114/Solutions/ch1problems.htm

Comments, Observations, Reflections