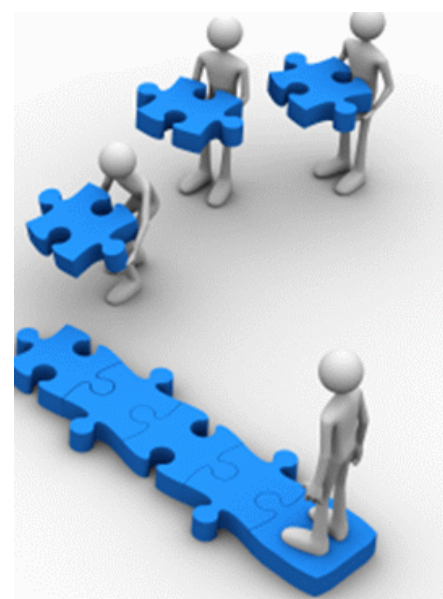# VR-4: Open Source Loss Simulation Model
2010 Casualty Loss Reserve Seminar

Presented by Robert A. Bear

Consulting Actuary and Arbitrator

RAB Actuarial Solutions, LLC

www.rabsolutions.net

Loss Simulation Model Working Party

- Sponsored by the CAS Dynamic Risk Modeling Committee (DRMC) in 2005, the LSMWP began work in 2006.

- Purpose: creation of a simulation model that will generate claims that can be summarized into loss development triangles and complete rectangles.

- Deliverables: Open source program available to CAS members, seminars, and a CAS Working Party paper documenting work.

- Time Frame: Completed when model and paper are uploaded after this seminar.

LSMWP Paper

- Introduction provides overview of project.
- Survey of existing literature
- Statistical tests of simulated model output: general discussion
- Basic features in the prototype model.
- Documentation of the open source model.
- Testing detailed output and fitting the model.
- Potential applications and model enhancements.
- Appendices: User instructions including parameterization of all distributions included in the model, a bibliography, and technical details on statistical tests performed.

# Where can we access Loss Simulation Model and documentation?

- The help files in the new open source Loss Simulation Model document all model features.

- The Loss Simulation Model, together with all model documentation, related papers and seminars, will be located on LSMWP web page:

    www.casact.org/research/lsmwp

- Program instructions are provided in Appendix A, and are also included within the model and on the LSMWP web page.

Reserve Variability

- If you run at least 100 iterations, the model will generate reserve percentile tables and customary statistics from the simulation results (e.g., mean, standard deviation, minimum and maximum).

- These tables are distributions of payments made subsequent to the assumed valuation date, both by accident year and by calendar year and for all years combined.

- This key model feature enables users to test their models for estimating reserve variability.

- Important application: estimating capital needed to support reserves.

Future Work
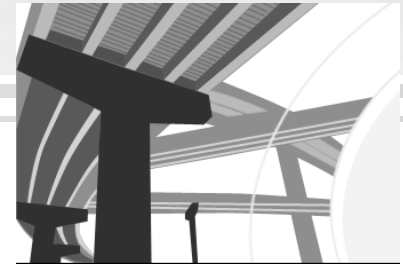
- The documentation within the model and on the CAS web site will be kept up to date as this open source software is enhanced.

- The DRMC plans to hold a 2011 Call Paper Program soliciting model enhancements and papers applying the Loss Simulation Model to test alternative reserving methods and models.

- Contact DRMC Chairperson if the instructions need clarification or if program bugs are discovered.

Why develop and use a simulation tool?

- "Mistakes are a part of being human. Appreciate your mistakes for what they are: precious life lessons that can only be learned the hard way. Unless it's a fatal mistake, which, at least, others can learn from."

  -- **Al Franken**

Summary

- The LSMWP developed and fully documented a model that we hope will become a valuable tool in researching loss reserving methods and models.

- We encourage actuaries to develop and document model enhancements through call paper programs.

- We hope that actuaries will use this model to:
  - Better understand the underlying loss development process.
  - Determine which methods and models work best in different reserving situations.
  - Reflect this knowledge in evolving loss reserving practices.

Panel Presentation

- Hai You, Vice President Technology, Goouon Actuarial Solutions: will present the new Loss Simulation Model through examples.

- Glenn G. Meyers, Actuary, ISO Innovative Analytics: will discuss tests of simulated output.

- Joseph O. Marker, President, Marker Actuarial Services LLC: will discuss testing detailed model output and fitting the model.

- Please refer to the LSMWP paper for biographies of this distinguished panel.