18 May 2009

Don’t Be Left Exposed by Bad Exposure Data

Casualty Actuarial Society – CARe 2009 – Bermuda

Outline

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- Historical context
- What we look for
- What we should look for
- What we can do

Historical Context

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1996 CAS Geo-Coding Survey

- **37% of respondents reported they were currently using geo-coded data for the monitoring of catastrophe exposures**

- **91% report that they believe geo-coded data will become useful in the monitoring of catastrophe exposures**

Historical Context

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ECRA (1960s)

- **Data = premium volume by class and state**
- **“PML” as f(premium)**

Travelers (1970s)

Historical Context

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CRESTA (1977)

Catastrophe Risk Evaluating & Standardising Target Accumulations

- **Standardized exposure information reporting**
- **Gerling Global Re, Swiss Re, Munich Re**

CRESTA reporting format

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ACCUMULATION CONTROL FORM **NEW ZEALAND**

NAME OF COMPANY

PERIL COVERED

☐ EARTHQUAKE

LINE OF BUSINESS[1]

☐ FIRE
☐ RESIDENTIAL RISKS
☐ COMMERCIAL RISKS
☐ INDUSTRIAL RISKS

LIABILITIES IN FORCE AT AND FOR

☐ GROSS
☐ NET
☐ 100% OF R/I TREATY

NAME OF TREATY

DEDUCTIBLE

☐ ....% OF S.I.
☐ ....% OF LOSS
☐ AMOUNT ...
☐ NONE

CURRENCY: NZD [IN 000][2]

No.	ASSESSMENT ZONES	LIABILITIES (not reduced by deductibles)											
		BUILDINGS			CONTENTS			BUSINESS INTERRUPTION			TOTAL		
		No. of risks	Insurable value	Exposed value	No. of risks	Insurable value	Exposed value	No. of risks	Insurable value	Exposed value	No. of risks	Insurable value	Exposed value
1													
2													
3													
.	for detailed description see map/legend												
.													
16													
17													
18	Floater Policies												
1-18	Total												

[1] Statement applies to direct and indirect business unless otherwise stated
[2] Incidental other currencies to be converted, unless otherwise indicated

Please note: Insurable value = Full or total value
Exposed value = Indemnity limit, first loss limit, sum insured

Historical Context

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- AIR / RMS / EQECAT (late 80s)
  - Initial reporting
  - Post-Andrew reporting
  - Post-Katrina reporting
  - Post-Ike reporting
- Rating agencies (late 00s)

Rating agency reporting format

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25i. For the data used in the generation of the Catastrophe Loss Estimates provided in question 26, please provide the requested percentages based on Total Insured Values (TIV*) for property exposures separately for Personal business and Commercial business. For Workers Compensation data, please provide the requested percentages based on payroll. Responses should be post-geocoding.

(01) Category of data	Percentage of Data Containing Known Attributes** (02) Personal Property %	(03) Commercial Property %	(04) Workers' Comp %
Location of Insured Properties/Workers Coded to the following level of detail:			
1. Exact Street Address			
2. Zip Code			
3. City			
4. County			
5. Other (please explain)			
(_____)			
6. Total of lines 1 through 5 (must sum to 100%)			
Characteristics of Property Insured or Property Containing Insured Workers:			
7. Occupancy Type			
8. Year Built			
9. Year of Last Substantial Risk Mitigation			
10. Construction Type			
11. Number of Stories			
Workers Comp Characteristics:			
12. Employee Count	XXX	XXX	
13. Payroll	XXX	XXX	

* Total Insured Value (TIV) is defined in the SRQ instructions.

** The percentage of data brought into the model that had known information for that category of data. For example, if 80% of the rating unit's personal lines data was given a value for year built, then show 80% in column (02) line 8.

25j. Please indicate if any of the data used in the calculation of the Catastrophe Loss Estimate provided in question 26 contains bulk coded data. Bulk coding of data includes methods, programs, or procedures that assign a pre-determined value or default value to a required data field when the actual value is unknown or missing and the assigned value is not verified for accuracy. This does not include geo-coding.

	(01) Type of Business Using Bulk Coding Methods	(02) Category of Data Containing Bulk Coded Data (i.e. Occupancy, etc)	(03) Percent of Data Containing Bulk Coded Data	(04) Explanation/Reason for Bulk coding
1.				
2.				
3.				
4.				
5.				

Rating agency reporting format

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25k.For the data used in the generation of the Catastrophe Loss Estimates provided in question 26, please provide the requested values and percentages based on Total Insured Values (TIV*) for property exposures separately for Personal business and Commercial business. For Workers Compensation data, please provide the requested percentages based on payroll.

(01)	Most Frequently Observed Value			Percentage of Data Containing the Most Frequently Observed Value		
Category of data	(02) Personal Property	(03) Commercial Property	(04) Workers' Comp	(05) Personal Property %	(06) Commercial Property %	(07) Workers' Comp %
1. Occupancy Type						
2. Year Built or Year of Last Risk Mitigation						
3. Construction Type						
4. Number of Stories						

25l.Please explain the methods used to verify the accuracy of data used in the Catastrophe Loss Estimate provided in question 26. This does not include geocoding. Please provide infromation for the five most important elements in determining the Catastrophe Loss Estimate. Examples include replacement cost, TIV, construction type, year built, occupancy type, etc. Verification methods include on-site inspection, third party vendors, software, independent audit, etc.

(01) Type of Business Verified	(02) Category of Data Verified (i.e. Occupancy, TIV, etc.)	(03) Percent of Data Verified	(04) Methods Used to Verify Data and Frequency of Verification	(05) Verification Performed By

25m.How are multiple location accounts handled when coding:

1. TIV for Commercial Properties Insured _____
2. Payroll & Employee Counts for WC Insureds _____

25n.

1. Do any of the property policies used to generate the catastrophe loss estimate provide time element coverages that are unlimited? (Yes/No) _____
2. If Yes, what percentage of the the total property TIV is associated with these policies? _____
3. If Yes, how is the unlimited time element exposure captured in the calculation of the catastrophe loss estimate?

Is this enough?

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Exposure information

Cat model output

Narrative

Things we look for…

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- Appropriate data
  - Detailed exposure information
- Geocoding quality
  - Level of resolution
- Vulnerability quality
  - Construction, occupancy, year built, # stories
  - Secondary modifiers
- Reasonableness
  - ITV assumptions
  - Year-on-year comparisons
  - Original rates

Things we should look for…

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- Quality of coding
  - Missing data
  - Data accuracy
  - Bulk / default coding
  - Homogeneity of exposures
  - “Lake Wobegon effect”
- Quality of model for given region / peril
  - Industry exposure database
  - Consistency with experience
  - Implied severity distributions
  - Awareness of modeling limitations

Things we should look for…

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- Sensitivity to model weaknesses
  - Large risks
  - High excess policies
  - Aggregate policies
  - Business interruption
    - Deductibles
    - Commodity prices
  - “Step function” exposure
    - “Loss compression”
    - Business interruption
  - Difficult-to-model exposures

Things we should look for…

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- Impact of multiple events
- Non-modeled perils
- Policy terms & conditions
  - Reinsurance treaty
  - Original policies
- Legal environment

Things we should look for…

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- Quality of management
  - Stability of portfolio
  - Claims settlement practices
  - Reinsurer relationships
  - Buying rationale
  - Survival of company
- Quality of broker / broking team
  - Willingness to answer questions
  - Ability to answer questions

What we can do…

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- Industry exposure databases
  - Location level data
  - Market share
- Sensitivity testing
  - Parameter uncertainty
  - Stressed assumptions
  - Correlations
- Confidence intervals
  - Awareness of modeling limitations

What we can do…

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- Credibility of experience
  - Historical events
  - Similar events
- Manage PMLs and limits
  - “Model error”
  - Charge for limit

What we can do…

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Understand modeling

Work to improve modeling

Communicate modeling uncertainty and limitations

Learn from experience

Anticipate future lessons

Please visit our websites for more information on our company, products and team members:

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Postscript

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Aesop, circa 600 BC:

> **"A one-ey'd Stag that was afraid of the Huntsmen at Land, kept a Watch that Way with T'other Eye, and fed with his Blind-side toward an Arm of the Sea, where he thought there was no Danger. In this Prospect of Security, he was Struck with an Arrow from a Boat, and so ended his Days…"**
>
> **The Moral: We are liable to Many Unlucky Accidents that no Care or Foresight can Prevent: But we are to provide however the Best we can against them, and leave the Rest to Providence.**